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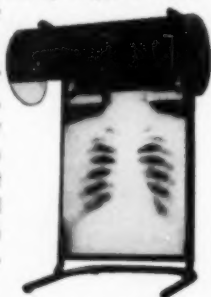


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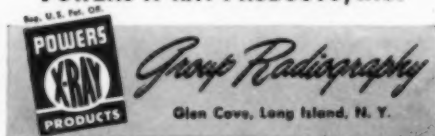
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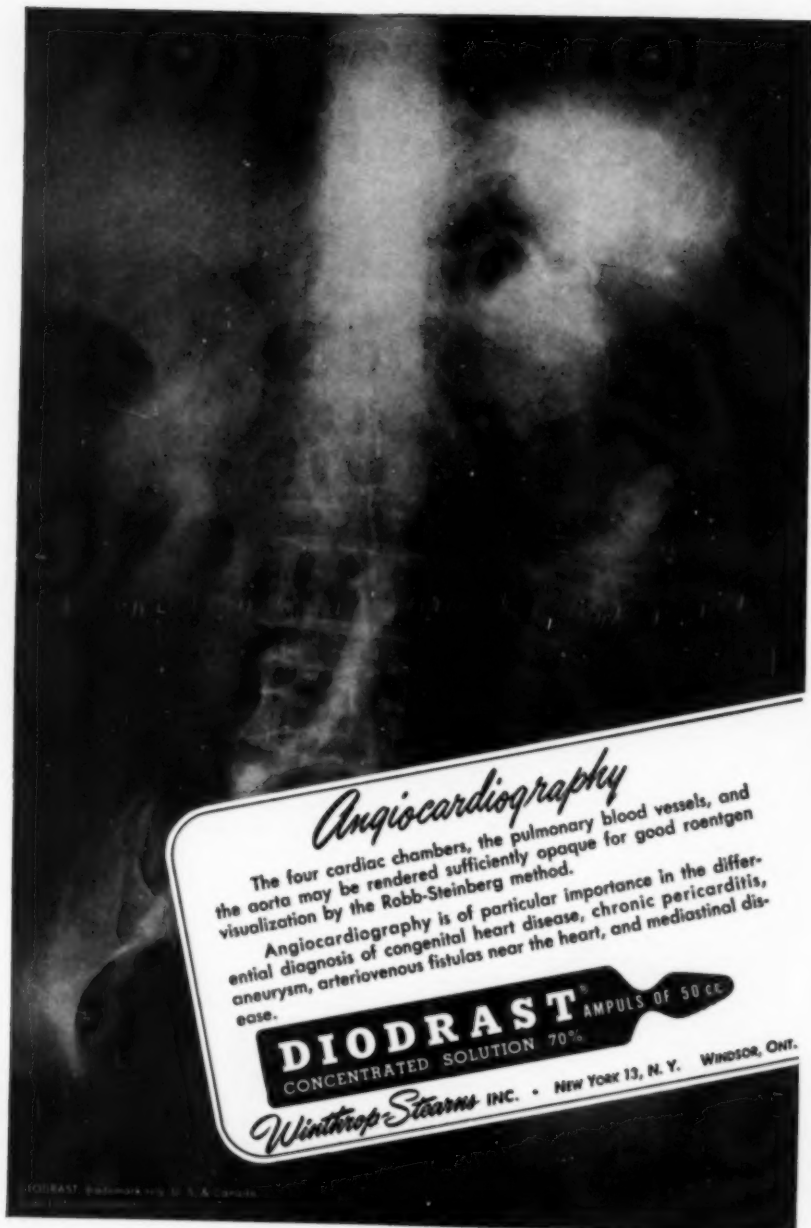
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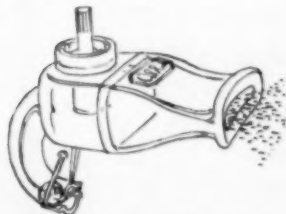
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DISEASES *of the* CHEST

VOLUME XX

AUGUST 1951

NUMBER 2

The Value of Exploration in Silent Lung Disease*

RICHARD H. OVERHOLT, M.D., F.C.C.P.†

Brookline, Massachusetts

Introduction

There are potentially-fatal diseases of the lung which may be cured by excision. An abnormal shadow on an x-ray film may be its only early manifestation. An absolute diagnosis may not be possible without opening the chest cavity and removing tissue for microscopic examination. Surgical exploration and immediate excisional therapy, if indicated, are logical, direct and safe methods for differentiation and treatment of abnormal shadows of unknown origin.

Exploratory Laparotomy of Established Value

The lives of many patients suffering from abdominal disease are saved because surgical exploration is common practice in cases of doubt. Not until doctors, generally, appreciated the value of exploratory laparotomy was it possible to show a high salvage rate in appendicitis, diverticulitis, perforated ulcer or intestinal obstruction. In the management of abdominal tumors, rarely is there an absolute diagnosis made prior to its surgical exposure. Much that has developed as sound procedure in the management of obscure abdominal disease holds true in respect to management of lesions elsewhere.

Shadows

In the field of pulmonary disease, a unique and challenging situation has developed. We are better able to prove the existence of and to localize organic disease through the use of x-ray films,

*From the Department of Surgery, Tufts College Medical School.

Presented at the First International Congress on Diseases of the Chest Rome, Italy, September 18, 1950.

†Member of the Staff of the New England Deaconess Hospital, the New England Center Hospital, and the Cambridge Tuberculosis Sanatorium.

in both the symptomatic and asymptomatic patient, than in other fields of medicine. Furthermore, radiology can be applied in the chest field less expensively and with greater facility and accuracy than in any other area of the body. This is true, for the expanded lung is of less density than any other internal organ, and any pathologic process that alters density of tissue can be more readily located here than in tissues showing less contrast. Within the lung, the air itself acts as a contrast medium. So the chest specialist is in a favored position to separate the normal from the abnormal.

The fortuitous circumstance, however, which delivers to him the patient with an abnormal shadow on the x-ray film creates a difficult diagnostic problem for him. The lesion may be discovered so early in its evolutionary stage that supporting evidence may be lacking. Decisions regarding management may be more difficult, yet if the life of the patient is to be safeguarded, the decision must be correct.

In most instances, the patient who seeks the advice of the chest specialist comes to him with a photographic record of an abnormal area of density or rarefaction. He then proceeds from there in the interpretation of the abnormal shadow. Patients ill from disease and those in whom there is substantiating evidence of organic disease in addition to the altered x-ray findings usually do not tax the ingenuity of the doctor as much as the patient with few or no symptoms. In both groups, however, the abnormal x-ray shadow may be the only positive clue of serious organic disease. Secretions for bacteriologic or histologic examination may not be available. Visualization of the interior of the central portion of the bronchial system with the bronchoscope may show no abnormality. Aspiration of areas under suspicion may produce no additional evidence. Then a decision must be made on the basis of an interpretation of an abnormal roentgenogram, which means upon the shadow of the lesion itself.

Shadows of Different Objects May Look Alike

The advent of visceral thoracic surgery has made available pathologic material from the living patient for correlation with clinical and x-ray findings. These studies have demonstrated repeatedly that the interpretation of x-ray shadows is not an exact science. In many instances, an honest opinion of an experienced radiologist may include several diagnostic possibilities. For example, a small, round shadow of moderate density found anywhere in the lung field (so-called "coin lesion") may turn out to be a tuberculoma, a hamartoma, a filled cyst, a primary carcinoma or a metastatic lesion. Diffuse shadows in the postero-

anterior projection often represent extension or total disease of a pulmonary segment or sub-segment. Identical shadows can be caused by different pathologic processes. When individual segments of the upper lobe are the site of either tuberculosis or cancer, the shadows on the x-ray film may look alike in the postero-anterior film. Lower segmental shadows caused by non-specific inflammatory processes may be indistinguishable from the shadows caused by segmental occlusion of early cancer.

There are other variables in addition to the similarity of densities of different pathologic processes which add to the confusing picture. One of these is the location of the obstructed segment or subsegment in relation to contiguous aerated segments. If there are inflated areas both in front and in back of the diseased one, the composite shadow in the conventional postero-anterior projection will be more diffuse or less well-defined than if there is little or no superimposed, aerated tissue. In the former instance, such shadows are often interpreted as tuberculous infiltrates, whereas they are, in reality, segments or subsegments totally seeded with either cancer or tuberculosis. Associated non-specific infection will influence the character of the shadow. Interpretation

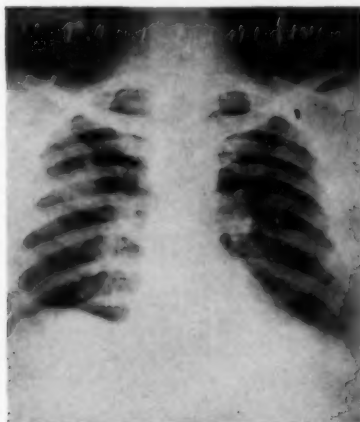


FIGURE 1



FIGURE 2

Figure 1: Silent shadow discovered when routine x-ray film was taken on admission to the hospital for repair of inguinal hernia. Repeated examinations of sputum were negative for tumor cells or tubercle bacilli. Two bronchoscopic examinations were negative and bronchial washings from each were negative for tumor cells or tubercle bacilli. O.T.C. No. 6586. Mr. M.H.C. Age 51. June, 1949.

Figure 2: The right lung of Mr. M.H.C. (See Figure 1), showing silent adenocarcinoma. There was no central necrosis or connection with major bronchi. Verification by methods other than surgical exploration was impossible.

is made even more difficult by the evanescent nature of densities created by secondary infection. Many errors have been made in the past because of temporary clearing of areas as the infection was brought under control.

Although it is generally recognized that the x-ray is a most valuable and dependable tool to locate areas of increased density, it is capable of revealing only shadows. It must be equally well appreciated that in the naming of the actual lesion which has caused the shadow the chance for error is a real one.

Abnormal Shadows and the Cancer Potential

In the field of diseases of the chest, radiologic screening has proved to be such an extremely practical and reliable tool for finding disease that an increasing number of potentially-serious lesions are brought under observation at an earlier stage of their development. This forces doctors to make critical decisions regarding the management of patients at a time when it is difficult to do so. The patients consider themselves well and want to be told "Nothing of a serious nature is present." The doctor has meager evidence to go on and often nothing more than the shadow of the lesion itself.



FIGURE 3



FIGURE 4

Figure 3: Silent shadow discovered during physical examination as a routine check-up. Examination of sputum, bronchial washings, and a bronchoscopy were all negative. O.T.C. No. 6183. Mr. G.F.S. Age 66, December, 1948.

Figure 4: The left lung of Mr. G.F.S. (See Figure 3), showing epidermoid carcinoma. Note its site at some distance from major bronchi. At exploration, the true diagnosis was readily established by a direct biopsy before the lung was removed.

The stark realization of the possible existence of cancer is always frightening. All doctors know that untreated cancer of the lung is invariably fatal. They also know that cancer may exist in a silent, yet shadow-producing form. The question must be asked, "Will my patient pay with his life if I advise a wait-and-see policy?"

What is the cancer potential when abnormal shadows are found in the lung field by x-ray? This question cannot be answered precisely. Patients referred to thoracic surgeons for exploration are heavily weighted as tumor suspects, and the ratio of neoplastic to non-neoplastic shadow-producing lesions will be high. Furthermore, in mass surveys, designed principally to find tuberculosis, the follow-up on tumor suspects has been delayed or inadequate so the true incidence of neoplasm to all abnormalities found remains yet to be established. For example, in 10 city-wide surveys sponsored by the United States Public Health Service, 1,382 possible tumors were found in 1,780,178 persons examined according to Bloomquist.¹ The yield was 0.8 per 1,000 (See Table I). The final breakdown of the group of tumor suspects is not as yet available. According to Hilbish,² however, in Minneapolis, Seattle and Wash-

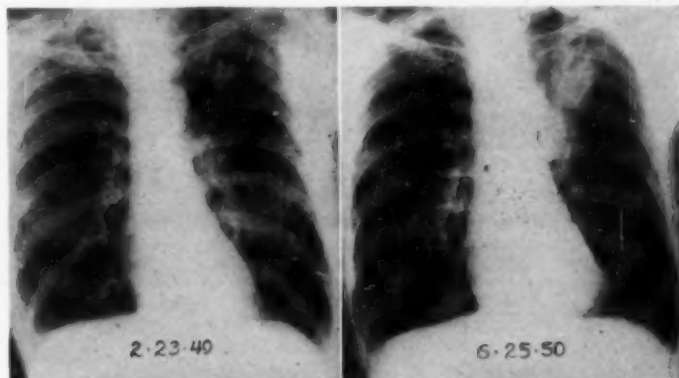


FIGURE 5

FIGURE 6

Figure 5: Industrial survey x-ray film made when applicant was first employed. A "spot" was mentioned to him, and he was advised to have another x-ray film in one year. He complied, and the shadow was still present and showed no change. He did not react to tuberculin, and was told that he might ignore the "spot". Mr. H.G. Age 50. February, 1949.

Figure 6: The appearance of the "spot" in the chest x-ray film of Mr. H.G. (See Figure 5) eight weeks after appearance of symptoms—first a protracted cold, then chest pain and general weakness. When he was referred for treatment, there was evidence of an extrapulmonary extension, for the left vocal cord and diaphragm were paralyzed and nodules in the skin revealed tumor cells. The diagnosis could be made easily, but nothing could be done to save the life of the patient. O.T.C. No. 7497. Mr. H.G. Age 52. June, 1950.

ington, the yield of primary pulmonary malignancy of all types (not including metastatic disease) was about 0.1 per 1,000. In a recent survey in Boston (the fall of 1949), out of 536,012 satisfactory films, 398 (0.75 per 1,00) were read as possible tumor suspects. To date, 333 (83 per cent) have been followed and 76 have been diagnosed as cancer. The incidence of cancer, therefore, proved to be 23 per cent of all suspected abnormal shadows.

TABLE I
Possible Tumors on 14 x 17 Inch Film Showing Rate
Per 1,000 Persons Examined.
Nine Chest X-Ray Surveys

Location	Persons Examined	Number of Possible Tumors (14x17 Imp.)	Rates per 1,000 Persons Examined
Savannah-Chatham County, Ga.	67,961	43	0.6
Gaston and Wayne Cos., N. C.	84,599	58	0.7
Milwaukee, Wisconsin	176,469	37	0.2
Minneapolis, Minnesota	301,513	404	1.3
Washington, D. C.	439,927	373	0.8
Seattle-King Co., Washington	368,129	261	0.7
Tacoma, Washington	72,703	32	0.4
Spokane, Washington	106,526	67	0.6
Salt Lake Area, Utah	162,351	107	0.7
TOTAL	1,780,178	1,382	0.8

E. T. Bloomquist, Senior Surgeon, Division of Tuberculosis.
U. S. Public Health Service Analysis and Reporting Section, Division of Tuberculosis, March 13, 1950.

TABLE II
Survey Lesions in the Overholt Thoracic Clinic
1938 to June, 1950—Total Patients Seen 7,504.

Survey Lesions	393
Resected or Explored	162
Tuberculosis	59
Tumors	58
Malignant	39
Benign	19
Cysts	28
Others	17

These statistics do not give the true picture. It will be necessary to re-evaluate survey figures after five or more years and determine errors in the original interpretation of the films. Undoubtedly, some cases of cancer were thought to be tuberculosis and escaped analysis as possible tumors. Clark et al.³ reported that 12 per cent of cases with an initial diagnosis of tuberculosis seen in one year at the Fitzsimmons General Hospital were found not to have tuberculosis and some of these had carcinoma.

The cancer potential in patients referred to surgical clinics for exploration is, of course, higher. Watson⁴ states that of 104 cases of silent intrathoracic tumors explored at the Memorial Hospital in New York City, 40 per cent proved to be malignant. Johnson, Clagett and Good,⁵ in a series of 53 cases, undiagnosed pre-operatively, found 74 per cent to be malignant. In the Overholt Thoracic Clinic, 162 cases have been explored for lesions discovered in survey, and 58 cases of neoplasm have been discovered, 67 per cent of these being malignant (See Table II).

These experiences establish beyond doubt that cancer can exist in a silent form and can produce an abnormal x-ray shadow. The relative frequency of the finding of early cancer in its silent phase is not nearly so important as it is to establish the fact of its occurrence. Regardless of how low or high the potential is finally found to be, the risk of the death penalty for the individual who has an untreated early cancer is 100 per cent.

What To Do About the Shadows

Advice need not be given to chest specialists as to what procedure constitutes the proper work-up for patients with or without symptoms in whom an abnormal shadow has been found within the lung field. It is important, however, to emphasize the importance of facing the issue immediately. The proper timing of treatment in cancer has more to do with success than any other single factor. The doctor, therefore, must recognize the fact that abnor-

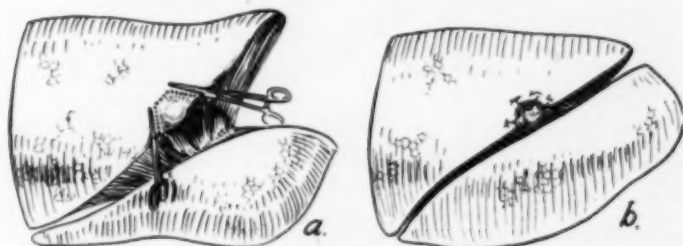


FIGURE 7: Illustration of method of a local wedge resection of lesion with small margin of normal lung tissue.

mal shadows found within the lung field must be labeled promptly.

Abnormal shadows in people over 35 years old, especially men, should be taken more seriously than when they occur in others. When it is a matter of deciding between tuberculosis or possible tumors, one is not justified in delaying for the result of guinea-pig

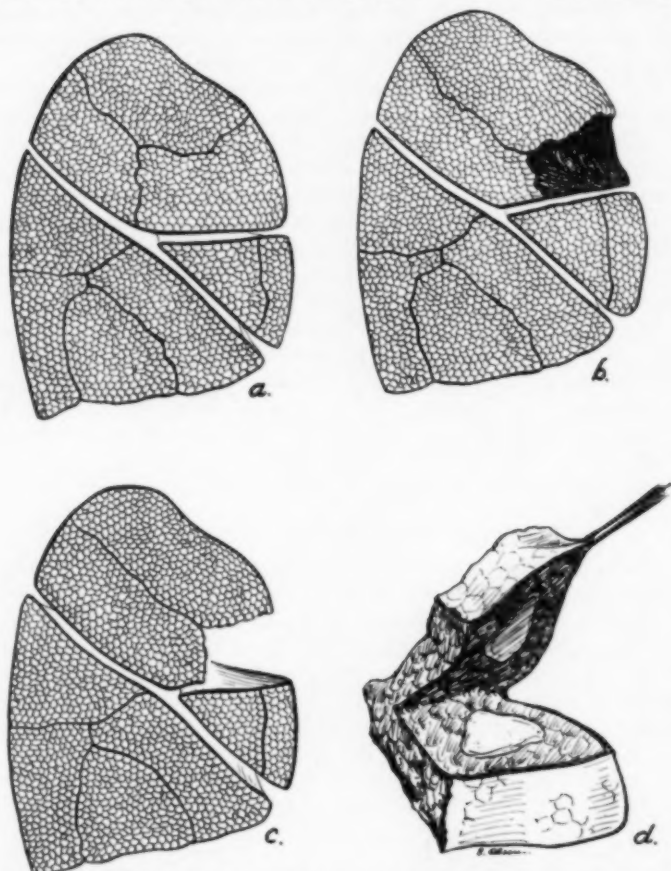


FIGURE 8: Illustrations of preliminary anterior segmental resection to determine absolute diagnosis in case of a centrally-placed tumor within that segment. This avoids sacrifice of healthy segments of corresponding lobe and accomplishes the complete removal of whatever process is found if it proves to be a benign lesion.

- A. Normal arrangements of segments of right lung.
- B. Appearance often found with cancer, tuberculosis or abscess which is limited to one segment.
- C. Appearance after resection of involved segment.
- D. Segment opened to reveal the lesion.

inoculations or cultures. The clinician must be content with smears of sputum, bronchial washings or gastric aspirations. It is also not fair to the patient to allow long intervals of time to elapse in order to compare films for possible change. For the same reason, delays for repetitious bronchoscopic examinations are unwarranted. Additions of time will permit growth, and the tumor may later come to be within the range of endoscopic vision. The same additions of time also result in greater lymphatic spread and may represent the difference between life and death.

Transthoracic aspiration for purposes of obtaining tissue for diagnostic verification has no practical value in questionable lesions, and needle biopsy should be completely omitted. This procedure cannot be done without risk. Regardless of the results, attempts at aspiration do not help in making the decision as to the necessity of exploration. A positive result does give advance information, but exploration still has to be done if the patient is to receive the benefit of treatment. A negative aspiration *does not* prove the *non-existence* of malignancy, and exploration must still be carried out to be sure of the diagnosis.

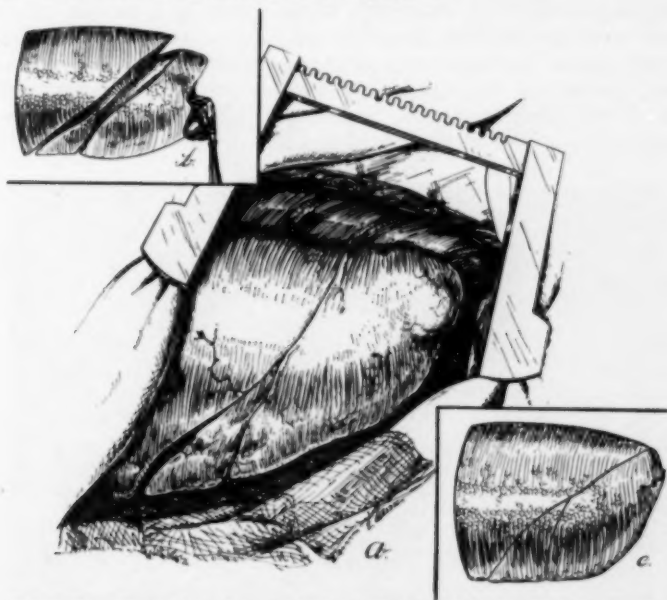


FIGURE 9: Illustration of removal of apical segment for localized tumor mass which could be either a tuberculoma or an early cancer. If the former, this method conserves all healthy tissue. If the latter, it permits the absolute determination of the diagnosis prior to the more radical type of resection required to successfully control cancer.

Since negative correlative studies do not rule out the presence of an early cancer, patients are entitled to have their cases carried to the highest court of appeal, i.e., the surgical amphitheater if there is any reasonable doubt as to the identity of an abnormal x-ray density.

This year, in the Overholt Thoracic Clinic, in the past 200 consecutive intrathoracic explorations, it has been found that in 37 per cent the absolute diagnosis could not be established pre-operatively. There were 33 patients in this group in whom cancer was found. In Table III, there are listed the various chest conditions for which intrathoracic surgical treatment was indicated.

Surgeon's Responsibility

It is the surgeon's responsibility to conduct a safe exploration in such a way that adequate tissue, representative of the lesion, is obtained for the pathologist and so that all possible healthy pulmonary tissue is conserved until the diagnosis of cancer is definitely proved. When the exact nature of the shadow-producing lesion is known, the surgeon can then wisely select the most appropriate method of treatment. If the lesion is a benign one, a local or limited excision should be done. If the lesion is malignant, a good cancer operation with a wide excision of pulmonary tissue and mediastinal lymphatics is indicated. Finally, the chest wall should be reconstructed to insure minimum discomfort in the convalescence and maximum restoration of function later.



FIGURE 10: Photograph of patient 4 years after left total pneumonectomy for primary cancer of the lung. Note absence of deformity. Patient is enjoying life and finds activities not unduly limited.

TABLE III
Two Hundred Consecutive Intrathoracic Explorations
Overholt Thoracic Clinic, 1950.

Final Diagnosis	Diagnosis Not Established Pre-operatively	Diagnosis Established Pre-operatively	Totals
1. Cancer, Primary L.	33	21	54
2. Benign Lung Tumor	10	0	10
3. Mediastinal Tumor	6	0	6
4. Tuberculosis	8	55	63
5. Bronchiectasis	4	34	38
6. Lung Abscess	9	0	9
7. Chronic Pneumonitis	5	0	5
8. Diaphragmatic Hernia	0	3	3
9. Miscellaneous	0	10	10
10. Undetermined	2	0	2
TOTALS	77	123	200

TABLE IV
Survival of Patients with Primary Cancer of the Lung Treated by
Resection Between 1932-1943 in Relation to Extent of Lesion.

	SURVIVAL		
	1 Year	3 Years	5 Years
Cancer Apparently Localized	91*	40	40
Cancer Found in Lymphatics (microscopic)	50	33	20
Gross Extension	46	0	0

*All figures in percentages (See Reference 7).

TABLE V
The Time Factor in Relation to Theoretical Cure Rate*

Time of Excision	Per cent Resectable	Percent of Localized of Favorable Lesions
After Appearance of Symptoms (Average 10 months)	30	11
No Symptoms, Yet Delayed Surgery (More than 3 months)	55	44
No Symptoms, With Prompt Surgery (Under 3 months)	100	75

*Based on Analysis of 863 Cases of Primary Cancer of the Lung Seen by
Author between 1932 and 1950.

The surgeon has various alternatives when it comes to obtaining tissue for histologic study short of removing an entire lung or lobe:

- 1) Surface biopsy may be possible if the growth extends to the periphery at any one point.
- 2) If the lesion is a small one and is near the surface, a wedge resection may be done.
- 3) A direct biopsy of a centrally-placed tumor after identification of vascular, bronchial and glandular structures may be taken.
- 4) Suspiciously enlarged lymph glands may be removed. A negative gland does not disprove the presence of cancer, however.
- 5) Segmental resection may be carried out. Many early tumors are well localized to a pulmonary segment. They may be removed completely and readily by a retrograde dissection of the segmental bronchus as described by Overholt and Langer.⁶ The fear of the doctor that his patient may sacrifice an entire lobe or lung in order to obtain tissue for the establishment of an absolute diagnosis is not justified today. Any one of the 18 individual pulmonary segments and, in some instances only a subsegment, may be used as the excisional unit. This conservative approach to the problem of exploration in the absence of an absolute diagnosis not only permits removal of all the tissue under suspicion, but provides an appropriate excision for all lesions that prove to be benign.

Promptness and Curability

Since cure of pulmonary cancer depends upon surgical excision, success is determined in large measure by two factors: (1) The extent of the lesion, i.e., an early localized growth; and (2) The skill of the surgical team. When the cancer-bearing organ is removed before there is gross or microscopic evidence of extension of the process outside the lung, survival rates should sharply rise as they do in the management of cancer elsewhere.

There have been few follow-up studies on long-term results. Overholt and Schmidt,⁷ however, found great differences in survival rates in patients treated by resection when the cases were grouped according to the extensiveness of the lesion (See Table IV). Twice as many survived one year if the lesion was found to be apparently localized as when there was evidence of extra-pulmonary extension at the time of operation. None of the patients with gross extension lived longer than 23 months. In 40 per cent of the cases with apparently localized lesions, a five-year survival was reported, and 20 per cent of those who had microscopic evidence of cancer in the lymphatics survived more than five years.

It is impossible to report on long-term results when lung cancer is treated during its silent stage. In our Clinic, all such cases are relatively recent. Operative findings, however, are available, and they suggest that the survival rates will be tremendously improved. For example, resectability rates have gone up from 30 per cent in patients with symptoms to 100 per cent in cases of silent cancer treated promptly (See Table V). It has also been encouraging to find a vastly greater proportion of localized lesions in the asymptomatic cancer that have been treated promptly. In our earlier experience with patients with symptomatic cancer, the patients came to us on an average of 10 months after the onset of symptoms. In a final analysis, there was evidence either clinically or at exploration of an extra-pulmonary extension somewhere in 89 per cent of all cases. In slightly over half of the cases in whom the abnormal shadow was discovered during the silent phase of the disease, there has been a delay of three months or more before treatment was recommended. In this group, 44 per cent showed extension. In 75 per cent, however, of those treated promptly, the lesions have been found to be localized, and even all lymphatic structures of the hilum or mediastinum have been found to be uninvolved (See Table V).

The contrast in the chances for survival of the patient, with or without symptoms of lung cancer, is striking. If the theoretical cure rate is based on whether or not the lesion is found to be strictly localized, the chances rise from 11 to 75 per cent. Actually, the cure rate should be higher than that, for some cases with lymphatic spread are still within the range of complete excision. In 20 per cent of the so-called palliative cases treated by resection of the lung and mediastinal lymphatics, there has been a five-year survival. When a significant number of cases that had silent cancer treated by excision promptly are followed for five years, the cure rates should equal or surpass that shown for any internal cancer.

SUMMARY

- 1) Diseases of the lungs can be more easily discovered during their early and silent form than those in any other internal organ.
- 2) Different pathologic processes within the lungs may produce identical x-ray shadows. Conversely, the same disease entity may produce different x-ray shadows.
- 3) All shadows cannot be labeled accurately at a time favorable for successful treatment unless surgical exploration is employed. In The Overholt Thoracic Clinic, it was impossible to establish an absolute diagnosis pre-operatively in more than two-thirds of the patients in whom excisional therapy was indicated.

4) In the past year, in 61 per cent of the cases of cancer seen, an absolute diagnosis could not be established until after exploration.

5) When symptoms are present, the likelihood of an extra-pulmonary extension of the cancer is high (88.6 per cent), and cure rates have been low.

6) When silent cancer is treated promptly, the chances of an extrapulmonary extension (lymphatic spread) is low (75 per cent), and cure rates should be high.

7) Cancer of the lung is the most favorable of all internal cancer because its silent shadow appears in survey films, and it can be properly identified and excised in its early and local form.

RESUMEN

1) Se pueden descubrir más fácilmente las enfermedades de los pulmones durante sus formas tempranas y silenciosas que las enfermedades de cualquier otro órgano interno.

2) Diferentes procesos patológicos pulmonares pueden producir sombras radiográficas idénticas. Por el contrario, la misma entidad morbosa puede producir sombras radiográficas diferentes.

3) No se pueden clasificar exactamente todas las sombras en una época favorable para el tratamiento satisfactorio a menos de que se emplee la exploración quirúrgica. En la Clínica Torácica Overholt fue imposible hacer un diagnóstico absoluto, preoperatoriamente, en más de las dos terceras partes de los pacientes en los que se indicaba la terapia de excisión.

4) En el año pasado, no se pudo hacer un diagnóstico absoluto, sino después de la exploración, en el 61 por ciento de los casos de cáncer que se vieron en la Clínica.

5) Cuando hay síntomas, es alta la probabilidad de que exista extensión extrapulmonar del cáncer (88.6 por ciento) y han sido pocas las probabilidades de curación.

6) Cuando se trata oportunamente el cáncer silencioso, las probabilidades de una extensión extrapulmonar (extensión linfática) son bajas (75 por ciento) y las probabilidades de curación deben ser altas.

7) El cáncer del pulmón es el más favorable de todos los cánceres internos porque su sombra silenciosa aparece en películas rutinarias y puede reconocerse y extirparse el tumor en su forma temprana y local.

RESUME

1) Plus facilement que dans tout autre viscère, dans les poumons les affections peuvent être découvertes aisément au cours de leur phase initiale et latente.

2) Des processus anatomo-pathologiques différents peuvent produire des ombres radiologiques identiques à l'examen pulmonaire. Inversement, des lésions semblables peuvent produire des ombres radiologiques différentes.

3) Il faut, en bien des cas, que soit utilisée l'exploration chirurgicale du thorax pour préciser la signification des ombres suffisamment tôt pour obtenir un traitement efficace. A la Clinique Thoracique de l'auteur, pour plus des deux-tiers des malades chez qui une thérapeutique d'exérèse était indiquée, on ne put avoir un diagnostic pré-opératoire de leur affection.

4) L'an passé, dans 61% des cas de cancers, ce n'est qu'après chirurgicale que le diagnostic a pu être établi.

5) Quand apparaît une symptomatologie, il y a beaucoup de chances (88.6%) pour que le cancer ait déjà essaimé en dehors du poumon, et les résultats post-opératoires sont peu favorables.

6) Quand le cancer latent est traité précocement, les chances d'un essaimage extra-pulmonaire par voie lymphatique sont faibles (75%) et les résultats post-opératoires sont favorables.

7) Le cancer du poumon est le meilleur de tous les cancers viscéraux parce que, lors de sa latence, les examens radiologiques systématiques peuvent en mettre en évidence les signes: il peut être diagnostiqué et traité lorsqu'il est encore à son début, et encore localisé.

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An Experimental Study of Plastic Synthetics in Thoracic Surgery*

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Since Tuffier's original description of the extrapleural operation in 1891, the procedure has been subjected to various modifications, particularly the introduction of different plombage materials. Fat was probably the first solid plombe to be employed, but was discarded rather early because of its inherent deficiencies: lack of resistance to pressure and tendency to liquefy. Bear's introduction of the paraffin pack was a notable step forward, and indeed this method is still in use. Subsequently, in a attempt to find the ideal type of plombe, various investigators have used gauze, rubber dam, rubber balloons, muscle flaps, and oil. As in all therapeutics, the very multiplicity of the agents used attests to the universal lack of applicability of any one. However, some of the discredit which has accrued to the procedure stems not only from the individual substance themselves, but from the very nature of the operation. One of the most frequent and disastrous complications of the procedure is broncho-extrapleural fistula. This has been commonly attributed to perforation of large, peripherally placed cavities either by pressure of the plombe, or secondary to necrosis of the cavity wall following stripping of its parietal extrapleural blood supply. Although there is no universal agreement on the pathogenesis of broncho-extrapleural fistulae, there is some evidence that pressure of an extrapleural pack may play a part. Certainly, too, those series in which case selection has been carefully carried out with regard to size, type, and position of cavities have shown a notably low incidence of fistulae.¹

The inadequacy of the plombage materials devised to date has led many phthisiologists to return to extrapleural pneumothorax as a definitive procedure or as a preliminary procedure to a permanent oleothorax. This approach has been particularly popular in Scandinavia and Mexico,² and workers in those countries attribute its efficacy to meticulous attention to detail in its performance. In this country, extrapleural pneumothorax has not become widely popular, chiefly because of the technical factors in the operation, the difficulty encountered in maintaining the space, and the need

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for constant close supervision of the patient. The search for an ideal plombage material has for these reasons continued sporadically.

With the advent of plastic materials, attention was naturally directed to their possible uses in surgery. Methyl methacrylate, more commonly known as lucite, was first applied in surgery for the reconstruction of cranial defects by Kleinschmidt³ in 1941. Wilson and Baker⁴ investigated its properties as a plombage substance in 1944, and suggested in their report that it be used in the treatment of pulmonary tuberculosis. It is particularly worthy to note the several criteria they listed for an ideal material: 1) non-irritating, 2) non-carcinogenic and non-antigenic, 3) of light weight so as to obviate the danger of perforating pleura and lung, 4) insoluble and chemically non-reactive in body tissues, 5) radio-lucent or almost so, and 6) capable of being molded to fit a body cavity through a relatively small incision.

Extrapleural pneumonolysis with lucite plombage was done at the National Jewish Hospital from 1947 to 1949 with a total of 89 operations in 73 patients. The overall results with regard to cavity closure and conversion of sputum have been good, but by no means perfect. The lucite spheres have not completely satisfied the criteria as set forth by Wilson and Baker, particularly in regard to their rigidity and tendency to produce pressure points on the extrapleural shelf. Their very shape militates against complete obliteration of the dead space, and although each sphere becomes surrounded by a hyalin capsule, the latter is an unstable avascular material, and a source of continued drainage if infection supervenes. Moreover, with a fibrotic contracted lung, or thick-walled cavity, there is tendency for displacement rather than collapse of the diseased area.^{5,6}

On the basis of these observations, it was felt worthwhile to investigate a series of plastic and other synthetic materials in an attempt to find a more suitable plombage substance.

Experimental Studies

Since the deficiencies of lucite had centered around its rigidity and shape, attention was directed toward plastic materials in sponge form. It was our opinion that a spongy material would compress evenly without the creation of pressure points, could be cut to fit an extrapleural space without residual dead space, and would not be subject to migration like lucite.

Vinyl Copolymer

The vinyl sponge initially used was manufactured in a small, local, plastics laboratory, and the physical characteristics varied

with different lots. Eight dogs were used in this series, the sponge being placed extrapleurally. In all of the dogs surviving for two months or longer there was definitely a fibrous reaction of some degree encompassing the plastic. In one case the fibrous tissue appeared to be penetrating the sponge, which had become very rigid.

The chief shortcoming of this material was its lack of uniform physical properties and the ultimate variation in consistency achieved in vivo. Moreover, even with autoclaving supplemented by Zephiran washes there was some degree of fluid reaction evoked. This was apparently due to the difficulties in washing the chemical plasticizer out of the substance.

Polystyrene

Polystyrene was used in a group of four dogs. In the two animals surviving there was a definite fibrous response about the sponge, and in one case there was some gross invasion of the sponge with strands of fibrous tissue.

Polystyrene is a commercial plastic product, rather widely used for advertising displays. It has the disadvantages of rigidity, and flakes very easily when being cut. Moreover, sections of tissue surrounding the sponge revealed a rather intense inflammatory cellular reaction. Because of its rigidity and friability no further studies were done with this material.

Cellulose

Cellulose does not fall into the category of plastic, but its resiliency and physical characteristics suggested its inclusion in this study. The material used was a white fine-pore pure cellulose*, and contained no plasticizing agent of the type normally used in cellulose sponges for commercial purposes. A review of the literature failed to reveal any reference to its previous use in the body, other than for the purpose of a biopsy sponge.⁷

The use of this material was restricted to two dogs and rapidly abandoned, since it became evident quite early that an intense and necrotizing reaction was immediately produced.

Neoprene

Neoprene is a synthetic rubber, and was manufactured for our purpose in the form of a foam sponge by the DuPont Company. Moreover, in order to eliminate as far as possible any extrinsic material that might act as an irritant, the product was subjected to extensive treatment, including a total of 12 washes in various solvents, and was finally sterilized in open steam for 20 minutes,

*Supplied by the DuPont Co. of Wilmington, Delaware.

following which it was dried for 18 hours at 70 degrees C. In addition, it was autoclaved just before use to insure sterility.

The material was placed in four dogs as an extrapleural plombé. Two of the dogs expired in the early postoperative period from abscesses. The remaining two survived but later autopsy revealed chronic abscesses and inflammatory reaction. The neoprene remained soft and rubbery, and was moderately adherent to the wall of the space, but could be easily stripped with the finger. There were no underlying pleural adhesions.

The neoprene, while not as explosively reactive *in vivo* as the cellulose, was nevertheless quite toxic despite its subjection to an intensive series of soap, methanol, alcohol, and distilled water washes. Moreover, the dogs surviving over two months revealed a chronic inflammatory rather than a fibrogenic reaction.

Formalinized Polyvinyl Alcohol †

The use of this material in experimental animals was first reported by Grindlay and Clagett.⁸ It is a synthetic plastic in sponge form. In the dry state the material is hard and rigid, but becomes delicately soft and compressible when wet with water. Of all the materials employed in this study, it appeared to answer most closely the physical characteristics we desired in a plombage substance.

Eight dogs were used in this group. Three still survive and are being kept for long term follow-up. Of the five dogs reported here,

†Produced under the trade name "Ivalon" by Ivano, Inc.

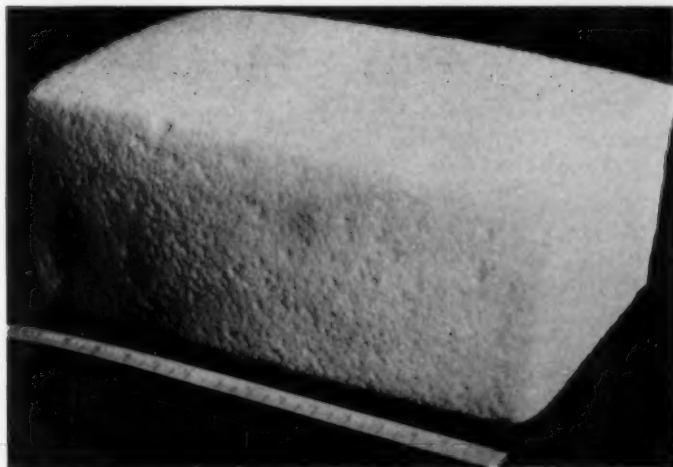


FIGURE 1: Formalinized polyvinyl alcohol sponge (Ivalon).

three had pneumonectomies and two extrapleural procedures with sponge packs. Two of the pneumonectomized dogs died after short intervals, one in 16 days, and the other in 21 days. The autopsy findings in these two animals were practically identical. In spite of bronchopleural fistula with contralateral spread, the sponge had become firmly adherent to chest wall and pericardium and was stripped away with some difficulty.

The third pneumonectomized dog survived, and was sacrificed after an interval of five and one-half months. During this period the animal remained in excellent condition, ate well, and showed no signs of toxicity. At autopsy the right hemithorax was completely obliterated without mediastinal shift. This obliteration was particularly interesting in view of the fact that the sponge had originally filled only two-thirds of the pleural cavity. The plastic had become densely adherent to pericardium and venae cavae on the medial aspect, and to the chest wall laterally. The chest wall appeared to be drawn inward, and the intercostal spaces were contracted. The bronchial stump was firmly enclosed in fibrous tissue. The sponge had become firm and dry except in the costo-vertebral gutter where it retained some sponginess. Removal of

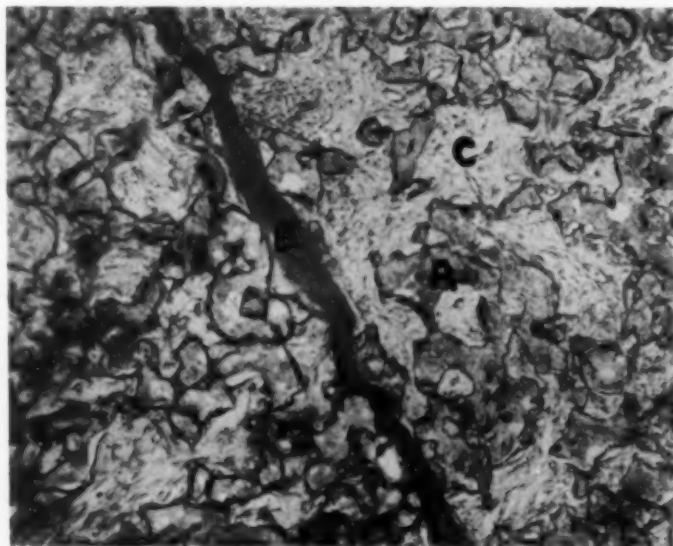


FIGURE 2: Low power microphotograph of formalinized polyvinyl alcohol sponge (Ivalon) removed from dog's chest after three months. (A) Sponge. (B) Heavy fibrous band running through body of sponge. (C) Looser fibrous tissue filling interstices of sponge.

the material had to be accomplished by sharp dissection, leaving a thin layer attached to contiguous structures.

Microscopic sections through the entire depth of the sponge revealed the pores and spaces completely infiltrated with loose and medium dense collagenous tissue, with few nuclei and some dilated capillaries. There was no pyogenic reaction. The bronchial stump also had a dense fibrous mucosa and outer coat without leucocytic response.

One of the animals with an extrapleural plombe developed a chronic infection in the space, but despite this survived in good condition until sacrificed at five and three-quarter months. Despite the infection, the sponge was firmly adherent to the walls of the space, and stripped with great difficulty. It remained soft and compressible.

The fifth animal, with an extrapleural plombe, was sacrificed at five and one-quarter months. The reaction in this dog was quite similar to the surviving pneumonectomized dog. The sponge was firmly enclosed in the extrapleural space, which was non-infected. The material was so densely incorporated that sharp dissection was required for its removal. The cortical portion of the pack had become dehydrated and firm, but the central portion remained soft and spongy.

The microscopic findings in this animal were likewise similar to those in the pneumonectomized dog. The outer thirds of the block revealed infiltration with relatively cellular fibrous tissue

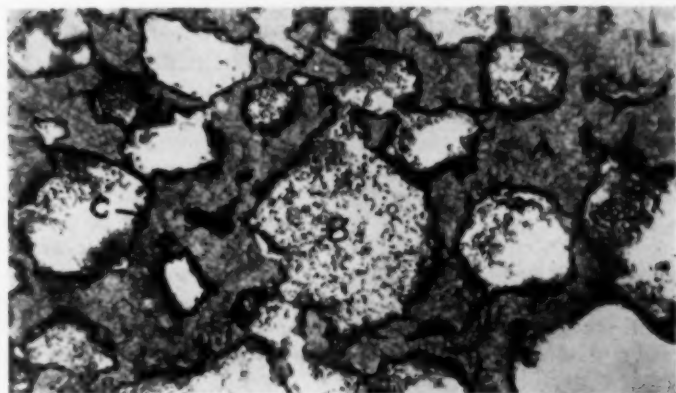


FIGURE 3: Microphotograph of formalinized polyvinyl alcohol sponge (Ivalon) inserted under scapula between stages of thoracoplasty. This was our first clinical trial of this material and when removed after three weeks was already markedly adherent. (A) Sponge. (B) Cellular reaction in sponge interstices. (C) Fibrous tissue already (3 weeks) lining the sponge interstices.

and some capillaries. The central third which grossly had appeared soft and spongy revealed a much looser fibrous invasion with residual open spaces and lacunae in the sponge which had not become infiltrated. There was no leucocytic response.

SUMMARY

A series of plastic and synthetic materials were subjected to *in vivo* study regarding their suitability as plombage substances. Of the five materials employed in this study, cellulose and neoprene appeared to evoke an early inflammatory and toxic reaction, and these were soon discarded. Vinyl sponge and polystyrene appeared to be relatively non-toxic, but did not compare favorably with the physical properties of formalinized polyvinyl alcohol. The latter material, in addition to its very desirable physical characteristics, appeared to have no toxic properties or undesirable chemical reactions in mammalian tissues. More important, it possesses the happy quality of producing a fibrogenic response to the extent that the plombe becomes completely infiltrated with fibrous and collagenous tissue. The findings in this study also suggest that the material may favor fortification of the bronchial stump with fibrous tissue. It would appear that clinical use of this material in selected cases is warranted.

RESUMEN

Se hicieron pruebas *in vivo* de una serie de materiales sintéticos para descubrir su adaptabilidad como sustancias para el plomaje. de los cinco materiales que se emplearon en este estudio, la celulosa y el *neoprene* parecieron causar una temprana reacción inflamatoria y tóxica y pronto fueron abandonados. Esponjas de *vinyl* y el *polystyrene* parecieron ser relativamente no tóxicas, pero fueron inferiores en sus propiedades físicas al alcohol *polyvinyl* formalinado. Este último material, además de sus muy deseables características físicas, pareció no tener propiedades tóxicas o reacciones químicas nocivas sobre los tejidos de mamales. Y aún de mayor importancia es que posee la feliz cualidad de producir una respuesta fibrógena hasta tal punto que el *plombe* llega a quedar completamente infiltrado con tejido fibroso y colagenoso. Los hallazgos en este estudio también sugieren que este material puede favorecer la fortificación del muñón bronquial con tejido fibroso. Parecería que está justificado el uso clínico de este material en casos seleccionados.

RESUME

Différentes substances plastiques et synthétiques ont été soumises à une étude *in vivo* au sujet de la possibilité de les utiliser comme

substances de plombage. Parmi les cinq substances employées, la cellulose et le "noéprène" semblèrent causer une inflammation et des réactions toxiques, elles furent vite éliminées. Les éponges de "vinyl" et de "polystyrène" semblaient relativement non toxiques, mais elles ne purent soutenir une comparaison favorable avec les propriétés physiques de l'alcool polyvinique formalinisé. Cette dernière substance, sans parler de ses caractéristiques physiques qui sont très favorables, a paru n'avoir aucune action toxique et n'a créé aucune réaction chimique fâcheuse sur les tissus des mam-mifères. Ce qui est particulièrement important, c'est qu'elle pos-sède l'heureuse qualité de constituer une réaction fibrinogène dans la région environnante, si bien que le plombage se trouve entièrement infiltré de tissu fibreux et collagène. Les constatations faites dans cette étude font entrevoir également que cette substance peut favoriser la consolidation du moignon bronchique grâce à l'apport de tissus fibreux. Il semblerait que dans certains cas précis, l'utilisation clinique de cette substance soit autorisée.

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The Use of Plastic Sponge in the Surgical Treatment of Pulmonary Tuberculosis

(A Preliminary Report)*

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One of the most important complications encountered in extrapleural plombage operations for pulmonary tuberculosis has been tuberculous infection of the extrapleural space. Experience has indicated that in the greatest majority of serious infections, the cause was progressive caseation of the lung periphery with erosion into the space. Plastic synthetic sponge which could be fitted into the space and which could rapidly set up a fibrogenic reaction seemed ideally suited. It occurred to us that the fibrous tissue growing directly into the interstices of the sponge as on a scaffold would incorporate this foreign substance within the body economy. The development of a fibrous wall "blockade" at the extrapleural shelf would also seal off the chance of tuberculous breakthrough.

After some two years of preliminary animal work,¹ clinical trials were made with vinyl copolymer. This material was used in three patients and contained a chemical plasticizer which caused the development of considerable fluid.

Case 1: F. D., a 43 year old, white female who had been ill since 1938 with bilateral upper lobe tuberculosis Figure 1a, was admitted to the hospital in April 1948. After bedrest, antibiotics and chemotherapy, an extrapleural pneumonolysis with vinyl sponge plombage was done on the left on June 29, 1949. Following this procedure, numerous aspirations were done yielding a thick brown-purple fluid which was sterile on culture. On November 29, 1949, a right extrapleural pneumonolysis with vinyl sponge plombage was done, Figure 1b. Postoperatively, the patient had fever and aspiration was again necessary for one month. The fluid was similar to that previously aspirated. There was a gradual retraction of sponges and sputum conversion took place in February 1950 and has remained negative since that time.

The other two patients had similar reactions but to a lesser degree. All are doing well, one having been discharged from the hospital six months prior to this report. Because of the peculiar fluid accumulations, the morbidity in the reported case and the finding of a new and apparently better substance, no further cases were done.

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Late in 1949, Grindlay and Claggett² reported some experimental work with a formalinized polyvinyl alcohol.* This substance was a soft, white sponge with water used as a plasticizer. Experimental work in our laboratory was encouraging and seemed to obviate the disadvantages of the vinyl material. We have now used this sponge in the surgical treatment of tuberculosis 17 times in 14 operations. The breakdown is as follows:

*Produced under the trade name "Ivalon" by Ivano, Inc., Chicago 16, Illinois.



FIGURE 1a



FIGURE 1b

Figure 1a: Bilateral upper lobe fibro-caseous tuberculosis.—Figure 1b: After extrapleural pneumonolysis with vinyl copolymer sponge plombage.

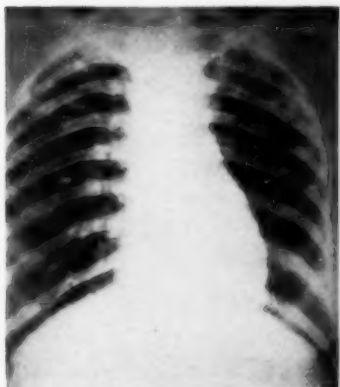


FIGURE 2a



FIGURE 2b

Figure 2a: Bilateral upper lobe fibro-caseous tuberculosis.—Figure 2b: After extrapleural pneumonolysis with formalinized polyvinyl alcohol (Ivalon) sponge plombage.

A. As an extrapleural plombage: 10 operations, 8 patients, (2 bilateral.)

Case 2: L.A., a 40 year old, white female was admitted to the hospital in September 1949 with bilateral upper lobe cavitary disease, Figure 2a. On December 14, 1949, an extrapleural pneumonolysis with formalinized polyvinyl alcohol plombage was done on the right. Postoperatively, the temperature rose to 100.6 degrees for one week and then fell to normal. On January 31, 1950 the same operative procedure was done on the left side, Figure 2b. Temperature again rose to 100.8 degrees but was normal by February 14th. Sputum became negative in March 1950 and has remained so to date. Patient is apparently well.

B. To fill the space some time after extrapleural pneumothorax: 5 operations, 4 patients, (1 bilateral).

Case 3: M. Z., a 25 year old, white female was admitted to the hospital in July 1948 for bilateral fibrocaseous tuberculosis. In January 1949 an extrapleural pneumonolysis with lucite plombage was done on the right. The postoperative course was uneventful. Sputum, however, continued to be positive. Extrapleural pneumothorax was established on the left on September 20, 1949. On February 3, 1950, the space was opened and formalinized polyvinyl alcohol was inserted. After an initial temperature rise, the temperature fell to normal within a few days. The sputum has been negative since October 1949.

C. As a prosthesis following resection: 2 operations, 2 patients.

Case 4: O.M., a 30 year old, white female entered the hospital on September 21, 1949 with caseous pneumonic disease in the upper half of the left chest, Figure 3a. After two courses of streptomycin, there was definite x-ray improvement, but sputum remained highly positive.

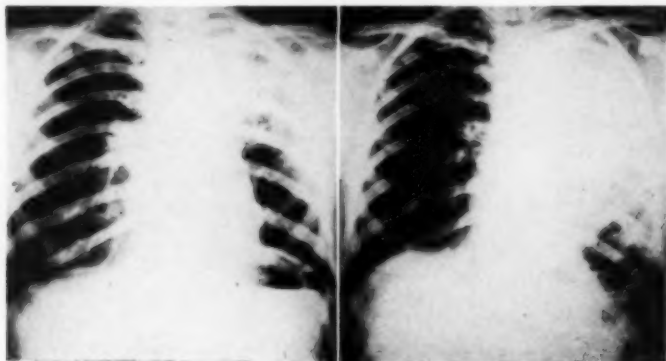


FIGURE 3a

FIGURE 3b

Figure 3a: Caseous pneumonic tuberculosis, upper one-half of left lung field.
Figure 3b: After resection of left upper lobe and superior segment of left lower lobe and replacement with formalinized polyvinyl alcohol (Ivalon) sponge.

Tomograms showed multiple cativation in the upper lobe. On April 13, 1950, a resection of the left upper lobe and a segment of the lower lobe was done, using formalinized polyvinyl alcohol to fill the remaining space, Figure 3b. The highest postoperative temperature was 101 degrees but was down to normal in two weeks. The sputum is negative.

Technique

The operation is performed as for extrapleural pneumonolysis. The sponge is prepared by boiling (shrinkage of about 20 to 25 per cent) and trimmed to fit the space. The lung is stripped slightly more than is required on roentgenogram and the sponge is firmly packed into position. The chest is closed without drainage.

Course

In general the postoperative course is uneventful. There is usually a slight rise in temperature for a few days with gradual fall. Fluid accumulating within the extrapleural space has not been a serious problem but may have to be aspirated at intervals in the first two to three weeks.

Comment

Our results in this brief period have been very encouraging. While sputum conversion rates do not mean much because of the small series, the results are already high. The use of synthetic plastic sponge opens new fields in the surgical treatment of tuberculosis and may prove of real value both as an extrapleural plombe and as a prosthesis following resection.

SUMMARY

Seventeen operations on 14 patients have been done using vinyl copolymer sponge and formalinized polyvinyl alcohol. The latter material appears better suited to clinical work with fewer complications. The early results of this work are encouraging in the surgical treatment of pulmonary tuberculosis, both as an extrapleural plombe and as a prosthesis following resection.

RESUMEN

Se han hecho 17 operaciones en 14 pacientes usando esponjas de vinyl copolymer y alcohol de polyvinyl formalinizado. Este último material parece ser más adaptable al uso clínico y causa menos complicaciones. Los resultados tempranos de este trabajo son prometedores en el tratamiento quirúrgico de la tuberculosis pulmonar como un plombe extrapleural o como una prótesis después de la resección.

RESUME

Dix-sept opérations pratiquées chez quatorze malades ont comporté l'utilisation d'une éponge plastique et d'alcool polyvinique formalinisé. Ce dernier produit semble préférable, et comporte moins de complications. Les résultats immédiats de ce travail sont encourageants pour le traitement chirurgical de la tuberculose pulmonaire, tant comme matériel de plombage extrapleurale que comme moyen de prothèse à la suite des exérèses.

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The Endoscopic Approach to the Vegetative Nervous System and Its Therapeutic Possibilities

Especially in Duodenal Ulcer, Angina Pectoris, Hypertension and Diabetes*

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Sympathectomy is not a new treatment. What I am discussing is only a new technic to be used when a sympathectomy is indicated.

The operation is performed as follows: A pneumothorax is established. When the thoracoscope is introduced into the chest the entire sympathetic trunk from the caudal portion of the stellate ganglion down to the diaphragm can be seen. Even the branches to the splanchnic organs and the rami communicantes can be visualized.

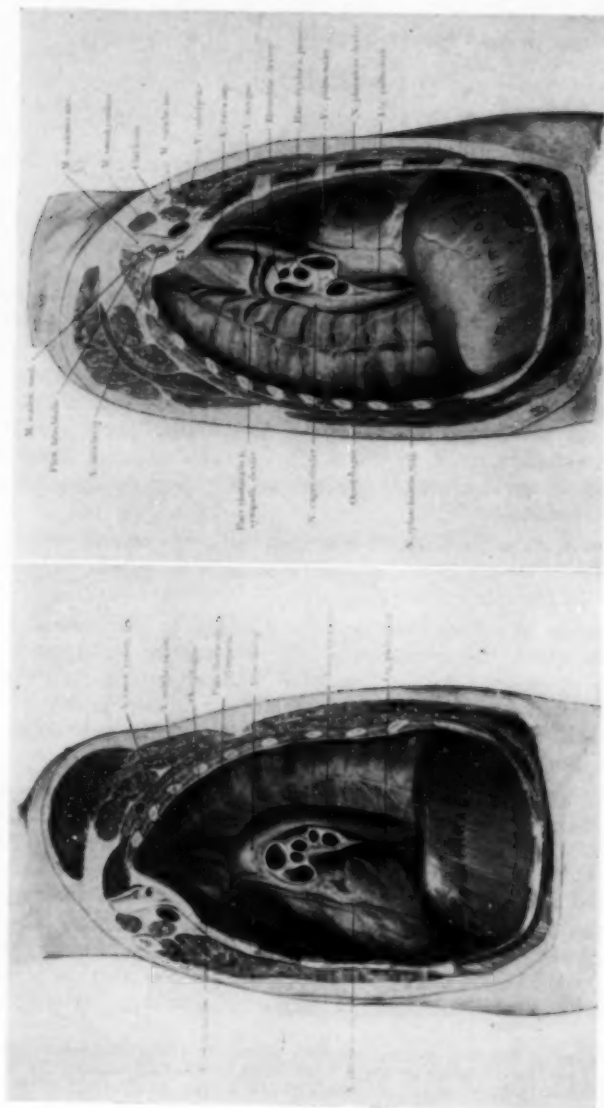
Figure 1 shows the left thorax and indicates clearly the anatomical relationship of the sympathetic nervous system. The same is seen on the right side (Figure 2).

By means of a thoracoscope, a long needle is then introduced, through which the sympathetic can be injected or divided by cautery by direct vision at any given point above the diaphragm. With a suitable instrument, the sympathetic, including the nerves from below the diaphragm, can then be evulsed. In a series of 500 operations no serious complications were observed.

You will ask yourself why this simple route has not been used when operations on the sympathetic nervous system have been performed for so many decades.† There are several reasons. First of all, at death the parietal pleura quickly clouds like the cornea so that in the cadaver where new operative procedures are usually tried the vagus and sympathetic nerves are no longer clearly seen. On the other hand, in open thoracotomies the reflex hyperaemia and the brilliant lighting of the operative field obliterates fine details. This may actually appear paradoxical but it is the

*Presented at the 16th Annual Meeting of the American College of Chest Physicians, San Francisco, California, June 22-25, 1950, and at the First International Congress on Diseases of the Chest, Rome Italy, September 17-22, 1950.

†With the exception of a few cases already described by Goetz¹ in "Clinical Proceedings," 1944, p. 102.



endoscopic illumination that brings out the vegetative nervous system in rich contrast and detail.

The advantages of this endoscopic method are, first, there is practically no operative risk; secondly, the procedure can be repeated and, third, the procedure can be performed under direct vision with a certainty of exact localization so that many new physiopathologic observations are possible. Thus, it is actually possible to record the action current of the sympathetic nervous system on an oscillograph and transcribe the deflections on a record so that one can hear the voice of the sympathetic nerves in health and disease.

Now I would like to speak about those indications which have been proved effective from my practical experience. It is generally accepted that peptic ulcer has a neuropathological genesis. Dragstedt² has introduced vagotomy on this basis. His results are explained by reducing secretion and motility, causing the stomach to rest. In addition to this concept, there is also a sympathetic angiospastic ulcer genesis. Different European surgeons as well as Crile³ explain their good results obtained in peptic ulcer following sympathectomy in this way. It must be emphasized, however, that the sympathectomy was done by a different operative technic. My personal experience is based on 200 endoscopically sympathectomized peptic ulcer patients.

The immediate results following sympathectomy are surprisingly good. The symptoms disappear promptly following sympathetic section. In comparison with our vagotomized patients, no post-operative vomiting is encountered. While the vagotomized patients are not able to tolerate a general diet for the first three or four weeks, the sympathectomized patients are able to tolerate a general diet immediately. In the case of 110 patients we have been able to follow the progress for a year and a half or more. These do not represent a selected group of patients, but all peptic ulcer cases admitted to the Surgical Clinic of Innsbruck for treatment after at least two medical failures.

Figure 3 shows an analysis of results according to the age of a patient. Figure 4 shows results in patients with ulcer history of less than two years.

At this point I should like to make it clear that endoscopic sympathectomy is not intended to take the place of gastric resection in peptic ulcer. We know quite well, from large statistics, that the postoperative distress in gastric resection becomes less and less the longer the preoperative history, just as we know from our experience in cholecystectomy. The simplest way to explain this fact is that it takes considerable time to accomplish psychic as well as functional anatomical compensation in disease. There-

fore, it has been established in most of the important European Clinics (in Innsbruck; Breitner, Baumgartner⁴⁻⁷) that no gastric resection should be done without a four year ulcer history. Thus, the optimal indication for endoscopic sympathectomy in peptic ulcer is a patient with less than a four year history and failure of previous medical treatment.

We can expect, however, not only to base surgery on the splanchnics on statistics and experience, but also, on sound physiological principles. These are: (1) The interruption of the afferent pain fibers. (2) The interruption of the irritating efferent fibers from

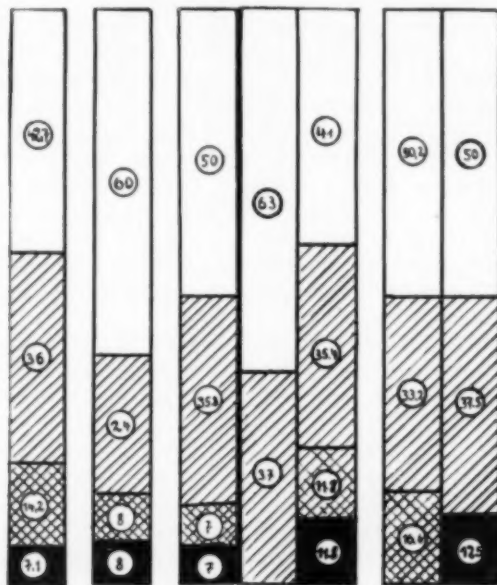


FIGURE 4

FIGURE 3

FIGURE 4

Figure 3: Diagrams composed of various columns showing the ages of patients operated for duodenal ulcers with endoscopic sympathectomy.

Column 1: Patients aged 15 to 20 years.

Column 2: Patients aged 20 to 30 years.

Column 3: Patients aged 30 to 40 years.

The white part indicates complete healing of ulcer proved by x-ray and clinical examinations. The shaded part indicates, no clinical symptoms, but x-ray film shows some residue. The checkered part indicates improvement only. The black part indicates no improvement.

Figure 4: Diagram composed of various columns showing pre-operative ulcer history. The first 2 columns describe the above mentioned group of patients between 20 to 30 years of age. The first with an ulcer history of less than 2 years (100 per cent good results), and the second column with more than 2 years ulcer history. The second two columns show the same condition in patients of 30 to 40 years of age.

the overstimulated brain to the sick organ. (3) Interruption of the vasoconstrictor fibers and, therefore, increased blood flow. (4) Relaxation of the pylorus whose tonus is determined by the sympathetic stimulation.

Now, we have to ask ourselves the important question: Why do we obtain satisfactory results when we cut the vagus as well as the sympathetic? We have already considered the theoretical background. The next question arises: Why do we not get, following sympathectomy (a) A vagal preponderance characterized by hypermotility of the stomach? This fact may be explained by three possible mechanisms. *The first* of these mechanisms may be explained by the well known theory that depression of sympathetic tone is followed by a compensatory lowering of the tone of the antagonist, namely, the vagus nerve. *The second* possibility may be explained as follows: you well know that increased sympathetic tone results in pylorus spasm. Following sympathectomy when the pylorus is relaxed no physiological necessity exists for increased gastric motility to overcome the previously existing pylorus spasm. I should like to consider the third possibility after discussing the

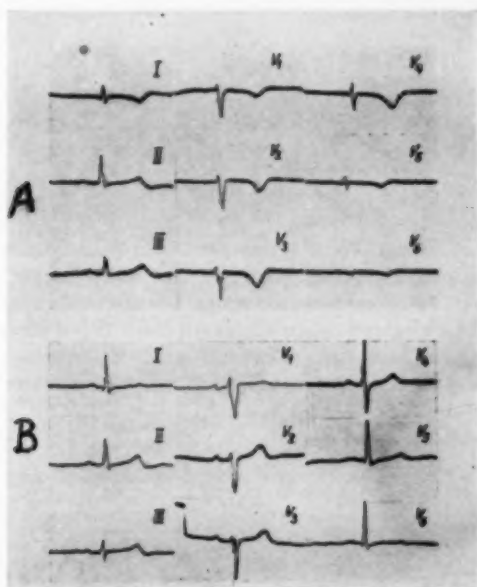


FIGURE 5: (A) ECG before the operation. The first column extremity lead; the second and third columns Wilson lead. (B) The same, 4 weeks after the operation.

next therapeutic indication, namely, angina pectoris. It is not my intention to discuss the pathogenesis of the condition, but should like to stress two fundamental therapeutic points. (1) When the upper thoracic sympathetic division is cut, the pain conducting fibers from the myocardium are eliminated. This is the reason why patients with irreversible changes in the coronary arteries should be excluded from this procedure. However, in functional states, the removal of pain fibers is followed by vasodilatation. The (2) second point is that we do not know exactly how sympathetic section affects coronary circulation. However, animal experimentation has shown that following division of sympathetic fibers, the coronary circulation is diminished. This may explain why none of the abnormal electrocardiograms in our patients disappeared immediately following sympathectomy even though all the patients immediately became asymptomatic. The story, however, was quite different four weeks later. I should like to show you electrocardiographic changes four weeks after the operation during which time the patient has received no additional therapy (Figure 5).

The difference between the immediate pain elimination and the late electrocardiographic changes may be explained by increased sympathetic tone in the postganglionic neuron. These changes were dramatically brought to our attention by patients who exhibit paradoxical gustatory sweat reflex. The gustatory sweat reflex simply consists of bringing about sweating by the ingestion of sour tasting material. The sweating is confined to skin areas which have previously been denervated by cutting the preganglion sympathetic fibers. An attempt explanation for this has been made by Peet⁸ and others by calling attention to hypothetical parasympathetic fibers to the sweat glands. However, if it is possible to produce vasoconstriction and so-called goose pimples in this sympathetic denervated area by local stimulation, then it can only be explained by an increased tone in the postganglionic neuron. This explains further why there is no increase on parasympathetic tone following sympathetic section in cases of peptic



FIGURE 6: Exeresis instrument.

ulcer. These investigations have been done with my collaborators Job and Vetter.⁹⁻¹¹

On the subject of hypertension no one from Europe would attempt to bring anything new with the possible exception of the technic. On this subject American medicine has attained unparalleled greatness. The endoscopic transthoracic approach is as radical as any other method because of the development of an instrument by which the sympathetic below the diaphragm can be pulled out. But it must be mentioned that this procedure of exeresis is only done in hypertension, in all other cases the sympathetic nerve is only cut with cautery in different places (Figures 6, 7 and 8).

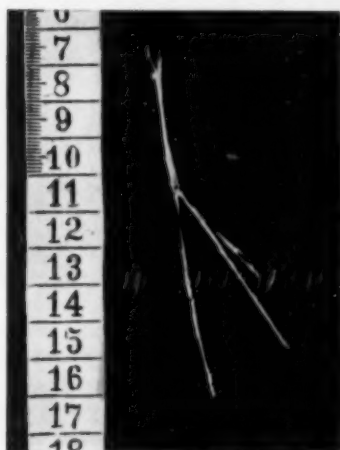


FIGURE 7

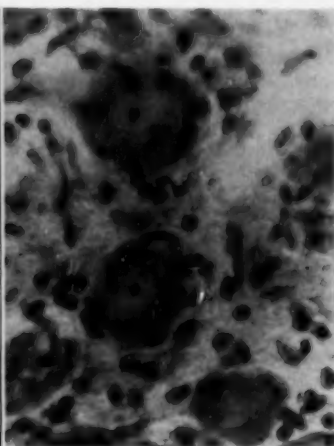


FIGURE 8

Figure 7: Resected thoracic sympathetic chain with splanchnic major.
Figure 8: Microscopic view of the above.

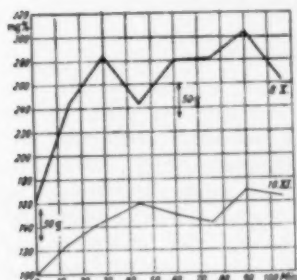


FIGURE 9

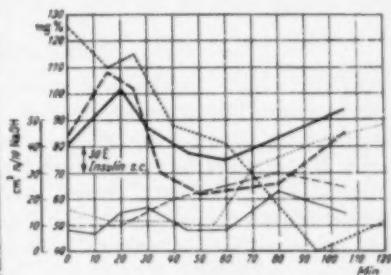


FIGURE 10

Careful clinical and laboratory examinations of sympathectomized patients have given us a new therapeutic indication. According to Canon,^{1,2} high blood pressure is most often the consequence of increased adrenalin activity. Therefore, we often find hyperglycemia in patients with hypertension.

Figure 9 shows the graphs of a hypertensive patient who has an elevated fasting blood sugar and pathological glucose tolerance curves. These findings returned to normal following bilateral sympathectomy. This is explained by the antagonistic effect of adrenalin on insulin. The elimination of the adrenalin antagonism results in increased insulin sensitivity.

Figure 10 shows the graphs of a peptic ulcer patient with normal blood sugar who received 30 units of insulin before and after sympathectomy.

The three lower curves reflect acidity of the stomach after insulin injections.

These are the observations upon which we base, in certain forms of diabetes, our therapeutic indication. As an example we may consider the course in juvenile diabetes which may be explained by the following. The therapeutic administration of insulin results in inactivity of the islet cells of the pancreas as in any organo-substitutional therapy. On the other hand, the administered insulin stimulates the adrenal medulla. It is immaterial whether the renal damage is the result of the toxic effect of the administered insulin or the consequence of a preexisting hypertension resulting from the increased adrenalin activity. In any case it is possible to depress adrenalin secretion by sectioning the sympathetic to the adrenals. Thereby, insulin utilization is increased and the above described pathological process is stopped.

In the time allowed no other therapeutic indications can be considered, such as circulatory disturbances in the upper extremities, epidemic hepatitis, other disturbances of the liver and biliary tract, disturbances of the lung, migraine, etc.

SUMMARY

The endoscopic approach to the thoracic sympathetic chain is described and has been practiced in more than 500 cases. In the treatment of more than 200 patients suffering from duodenal ulcers the method has been proved. Excellent results have been obtained from carefully chosen cases of Angina pectoris. The method represents an improvement in the treatment of hypertension, because there is practically no operative risk. Therefore, the indication may be enlarged. For certain cases of diabetes the method can be recommended.

RESUMEN

La vía endoscópica hacia la cadena simpática torácica se describe y ha sido empleada en más de 500 casos. En el tratamiento de más de 200 enfermos de úlcera duodenal se ha probado este método.

Se han obtenido excelentes resultados en enfermos bien escogidos de angina de pecho. El método representa una mejora en el tratamiento de la hipertensión porque prácticamente no tiene riesgo operatorio. Por tanto la indicación puede ampliarse.

Para ciertos casos de diabetes el método puede ser recomendado.

RESUME

Les opérations sur la chaîne sympathique thoracique peuvent être réalisées simplement et sans risque opératoire. Après la création d'un pneumothorax, au moyen d'un pleuroscope, on infiltre le sympathique, ou on le sectionne par un cautère en n'importe quel point au dessus du diaphragme. Avec un instrument convenable, l'exérèse peut être faite et les nerfs sous diaphragmatiques arrachés.

Dans une série de 200 opérations, l'auteur n'a observé aucune complication. Cette méthode a été employée avec succès dans l'hypertension, l'ulcus duodénal (nous interroignons dans notre traitement de l'ulcère peptique le sympathique et non le vague), les maladies du foie, les voies biliaires, l'angine de poitrine ou le diabète.

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Clinical Results and Physiological Effects of Immobilizing Lung Chamber Therapy in Chronic Pulmonary Tuberculosis*

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Introduction

The mechanism by which a normal pulmonary ventilation was produced in patients with pulmonary tuberculosis without voluntary breathing and without movement of the chest wall was described in 1940.¹ An adequate gas exchange between the lungs and the atmosphere could not be maintained in animals with experimental respiratory paralysis by the alternating pressure method of Thunberg² until the bronchial tree was kept open by equalizing the pressures on both sides of the chest wall; by accurately counterbalancing the resistance in the respiratory passage-way from the nose to the alveoli, an equal pressure was maintained on the outer and inner surfaces of the thoracic cage and the upper and lower surfaces of the diaphragm.^{1,3} Pressure respiration with constant lung volume was then achieved by varying the density of atmospheric air, with complete arrest of chest movement in patients in whom excessive narrowing of the bronchial tree was not present.

In subsequent clinical reports by the authors and others, this form of lung rest was shown to be responsible for closure of cavity and arrest of disease in cases of pulmonary tuberculosis.³⁻⁸ The intention of this paper is (1) to describe some of the unique physiological effects of ventilating the lungs without apparent lung movement, and (2) to present the follow-up results of 19 of 29 cases in which arrest of disease took place as a consequence of immobilizing lung chamber therapy.

Circulatory Effects of Immobilizing Lung Chamber Therapy

Among the effects previously reported of residence in the immobilizing lung chamber in patients in whom arrest of all chest

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movement was induced, are a decrease in pulse rate of 7 to 20 beats per minute, a fall in systolic blood pressure of 15 to 20 mm. Hg., and 5 to 10 mm. Hg. in diastolic pressure; in 40 records of the electrocardiogram during two hours residence in the chamber, an average elevation of 0.8 mm. took place in T-1 and T-2.

During the past year, measurements of the cardiac impact were made by the use of the portable ballistocardiograph devised by

CARDIAC IMPACT

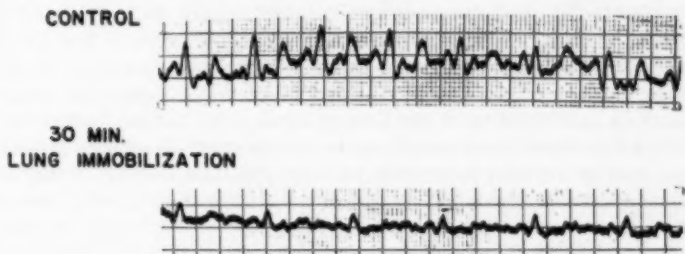


FIGURE 1: Cardiac impact recorded by Dock-Ballistocardiograph during normal respiration at bed rest (control) and immediately after 30 minutes lung immobilization in chamber. The pulse rate at bed rest (controlled) was 102 per minute and after immobilization 78 per minute. The blood pressure at bed rest was 92/68, and after immobilization 92/62.

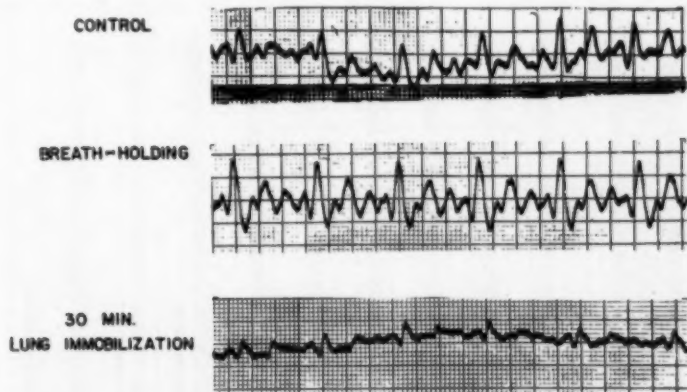


FIGURE 2: Cardiac impact recorded by Dock-Ballistocardiograph during normal respiration at bed rest (controlled), during breath-holding and immediately after 30 minutes lung immobilization in the chamber. The pulse rate at bed rest (control) was 86, during breath-holding 86, and immediately after lung immobilization 80.

Dock.⁹ The comparison of a record taken before and at the end of one hour of residence in the immobilizing lung chamber is shown in Figure 1. The records are taken immediately after the current is turned off and represent, therefore, the half minute period immediately following the period of arrested lung movement. The effect of breath-holding in inspiration is also illustrated for comparison in Figure 2. The sharp decrease in systolic cardiac impact after lung immobilization is revealed, as well as the absence of variation of cardiac impact due to normal inspiration and expiration. An analysis of 12 determinations in nine patients tested in this way is shown in Figure 3. An average decrease of 26.8 per cent in the factor used to represent cardiac impact took place as a result of this form of lung rest. According to Starr,¹⁰ the Dock ballistocardiograph yields information comparable to that of the body ballistocardiograph. Since this kind of measurement represents in part velocity of the flow of blood from the ventricles, the effect of arrested lung movement in the chamber on cardiac output can only be inferred from these records. The data naturally suggest that a marked reduction in the work of the heart takes place. The factor employed to make relative comparisons of cardiac impact was the slope of I J times the heart rate.

Since the venous pressure was not found to be significantly altered by residence in the chamber, the decreased cardiac impact did not appear to be due to interference with the flow of blood but rather, at least in part, to a lowering of the oxygen consumption or the total metabolic work. Conversely, when studies were made with the Dock ballistocardiograph on the effects of pressure

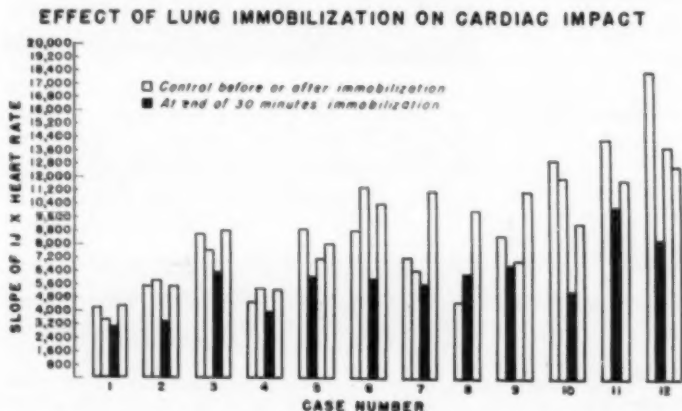


FIGURE 3: Results of 12 determinations on 9 patients before and immediately after 30 minutes lung immobilization in the chamber.

breathing, the decrease in cardiac impact was found to be accompanied by a parallel elevation of the venous pressure.¹¹ In similar current studies on pressure breathing maintained in the dome of the conventional respirator, and by negative pressure in the body of the respirator, the decrease in cardiac impact was at times paralleled by an increase in venous pressure. The reduction in cardiac impact which takes place in the immobilizing lung chamber is thus not due to damming back of blood into the systemic venous reservoir, as it is in pressure breathing, but presumably, at least in part, to a decrease in total oxygen consumption.

*Effects on Serum and Urine Potassium of Residence
in the Immobilizing Lung Chamber*

The unique character of bodily and mental rest, which is manifested by patients in whom complete arrest of lung movement takes place, has been previously described. In patients in whom surgery was to be performed Randall et al.¹² reported that a fall in serum potassium took place the day of the operation; the inference that a state of psychic tension had the effect of decreasing

**ELEVATION OF SERUM POTASSIUM AFTER
ONE HOUR IN IMMOBILIZING LUNG CHAMBER**

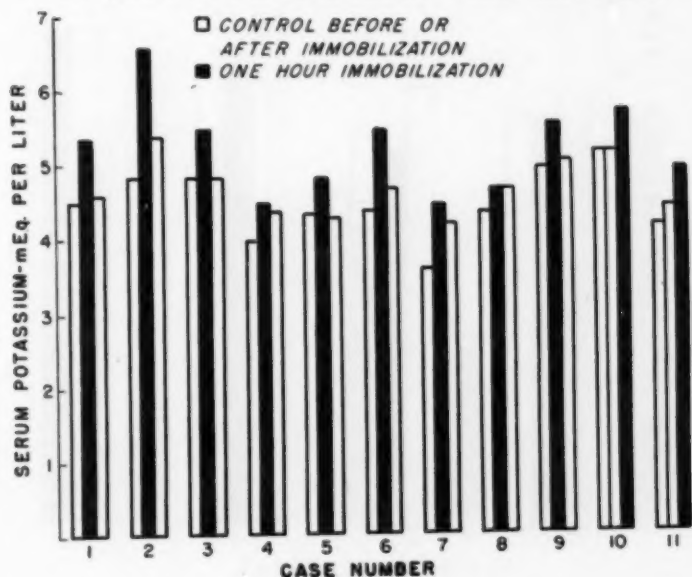


FIGURE 4

serum potassium appeared, at least, to be a working hypothesis. Since the opposite kind of phenomenon, namely exceptional mental relaxation, was observed in patients in the chamber, a study of serum and urine potassium was instituted. In this paper, a preliminary report of the findings will be made.* In Figure 4 the response of the serum potassium in 11 cases to residence in the immobilizing lung chamber for one hour is shown in Figure 4. A significant increase in serum potassium takes place, when comparison is made to periods before and after lung immobilization.

*The authors wish to express their appreciation to Dr. H. T. Randall and Dr. G. H. Mudge for their cooperation in carrying out the serum determinations here reported.

CASES WITHOUT ELEVATION OF SERUM POTASSIUM AFTER ONE HOUR IN IMMOBILIZING LUNG CHAMBER

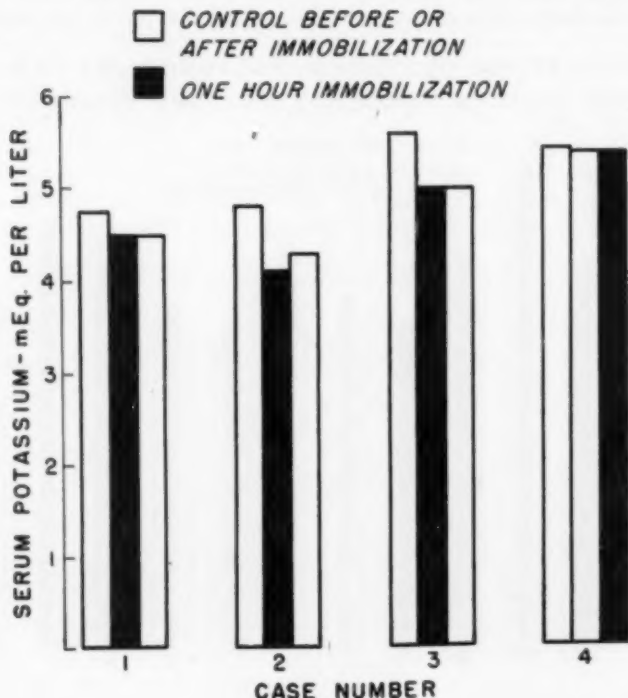


FIGURE 5

This increase is at times as high as 1 milliequivalent. In Figure 5 the response of four cases in which elevation of the serum potassium was not found is shown. Elevation of serum potassium does not, therefore, occur in all cases and is especially not apt to take place if some degree of lung movement is present. The decrease in urine potassium excretion after four hours residence in the immobilizing lung chamber, compared to four hours of bed

DECREASE IN URINE POTASSIUM AFTER FOUR HOURS IN IMMOBILIZING LUNG CHAMBER

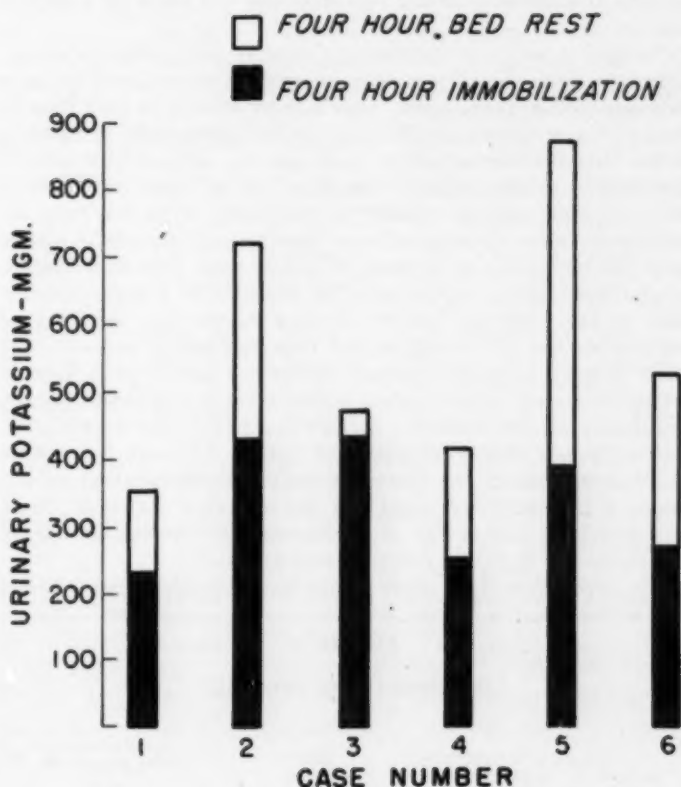


FIGURE 6

rest, is revealed in Figure 6. A striking drop in output of potassium took place in five of the six cases, the average decrease being 38 per cent, without, however, a concomitant drop in urine volume.

The decrease in elimination of potassium in the urine was not accompanied by any consistent changes in sodium output in the urine; the mean change was minus 2.3 per cent. The mechanism of this change in serum and urinary potassium may be related to a lessening of the stimulus to the adrenal gland associated with the decrease of psychic tension produced by cessation of respiratory chest excursions. Another explanation, which may play a role of varying degree, is dependent upon the apparent marked decrease in cardiac output, which would result in decreased renal blood flow which in turn might be responsible for a decrease in elimination of potassium. However, this interpretation seems unlikely because the sodium urinary excretion did not react in a similar manner.

Changes in serum potassium and urinary elimination of potassium have been shown to be dependent on alterations in the acid base equilibrium of the blood, especially by Atchley et al.,¹³ Darrow et al.,^{14,15} and others. On the basis of our observation of patients in the chamber carried out 11 years ago, the arterial CO₂ content appeared to be only slightly altered, a fall of 2 mm. having been found in some patients treated at that time. Since the tidal air of patients in the chamber is lower than normal immediately after lung immobilization is stopped, it would seem that the changes in acid base balance would be in the direction of a slight alkaline shift in pH. However, further detailed studies are necessary to determine what alterations in acid base equilibrium actually take place. Marked potassium deficit has been reported with adrenal cortical hormone (desoxycorticosterone acetate) administration by Kuhlmann, Ragan, Ferrebee, Atchley and Loeb¹⁶ and by Ferrebee, Parker, Carnes, Gerity, Atchley and Loeb.¹⁷ Although the precise and full mechanism of decreased potassium elimination in our studies is not completely explained, the inference that it is related to a decreased stimulation of the adrenal gland seems at least a justifiable one from the evidence now at hand.

The elevation of the T-wave, which had been previously difficult

FIGURE 7

NUMBER CASES TREATED	
29	
Arrested	Temporary or no Significant Improvement
19	10

to interpret, now appears to be related, at least in part, to the rise in serum potassium in patients in whom complete arrest of lung movement is produced. The concept was originally presented that a local rise in oxygen tension of cardiac muscle may be a factor, produced as a consequence of the maintenance of a normal arterial oxygen saturation with a diminution in oxygen concentration of cardiac tissue.

TABLE I

Follow-up Results in 19 Patients with Advanced Pulmonary Tuberculosis in Whom Arrest of the Disease was Accomplished by Immobilizing Lung Chamber Therapy.

Case No.	Therapy Ended	Present State	Remarks
1. A.D.	Sep. 1938	Arrested	3 relapses for total of 18 months bed rest.
2. L.M.	Jul. 1941	Arrested	No relapses 9 years.
3. H.McD.	Jan. 1942	Arrested	No relapses 8½ years.
4. W.P.	Jan. 1946	Arrested	Active 3 months in 1949. Arrested with second course.
5. J.S.	Aug. 1946	Arrested	Active 7 months in 1948. Required bed rest.
6. M.S.	Jan. 1947	Arrested	No relapse in 3½ years.
7. J.Y.	Apr. 1947	Arrested	No relapse in 3¼ years.
8. A.B.	Apr. 1947	Arrested	No relapse in 3¼ years.
9. A.F.	Jan. 1948	Arrested	Cavity closed. New cavity July 1948. Closed, bed rest.
10. J.F.	Feb. 1948	Arrested	No relapse in 2½ years.
11. R.R.	Jul. 1948	Arrested	Cavity closed in right lung. Left thoracoplasty.
12. I.K.	Dec. 1948	Arrested	Relapsed after 1 year. Left pneumonectomy for narrowed main stem bronchus.
13. M.DeP.	Jun. 1947	Active	Cavity closed. Positive, from unknown source.
14. J.B.	Sep. 1947	Active	Cavity closed. Negative for 2½ years. X-ray shows no new disease.
15. S.R.	Oct. 1947	Active	Cavity closed for 2¼ years. New cavity in Jan. 1950.
16. K.C.	Jun. 1949	Active	Cavity closed. Negative for 7 months. Cavity reopened.
17. S.	Jan. 1940	Unknown	Negative 1 year. No follow.
18. M.B.	Jul. 1943	Unknown	Negative 1 year. No follow.
19. W.T.	May 1941	Dead	Negative 4 years. Became active after a fall. Ambulatory. Death by accident.

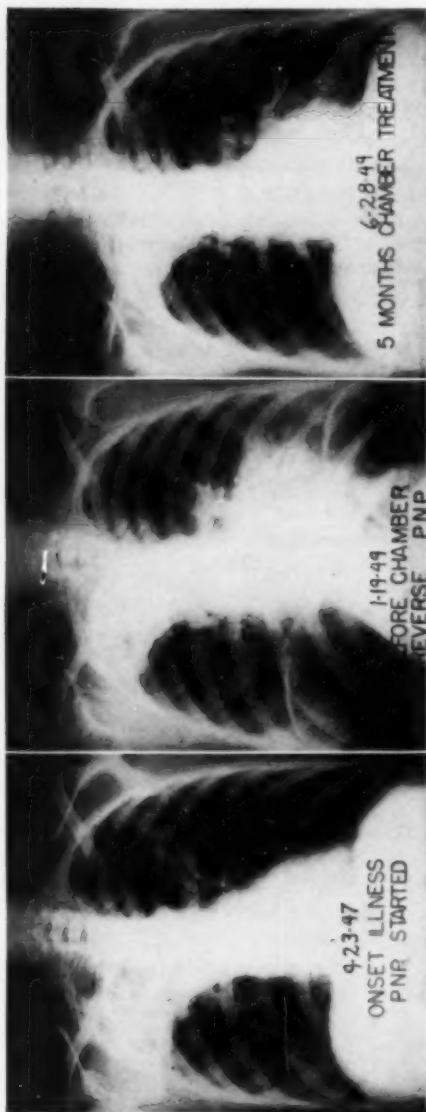


FIGURE 8

Figure 8: Twenty months after onset of symptoms, first x-ray secured.—Figure 9: After 16 months of pneumoperitoneum therapy and 4 months of streptomycin (120 gms.), x-ray revealed shrinking of right upper lobe without alteration of size of the contained cavity and spread disease to the left lower lung field.—Figure 10: After 5 months chamber therapy x-ray revealed clearing of disease in left lung and disappearance of cavity in right upper lobe.

FIGURE 9

FIGURE 10

Clinical and Follow-up Results

The clinical results of recently treated cases, added to those previously reported, indicate that of 29 cases of advanced pulmonary tuberculosis, 19 obtained an arrest of the disease characterized by closure of cavity and negative sputum for periods varying between six months and nine years (See Figure 7).

The response in the individual cases is shown in Table I. In five of these 19 arrested cases, the sputum has recently become positive; the original cavity re-opened in two cases, a new cavity appeared in a second case, and in the remaining two cases, no cavity or new infiltration was observed despite the development of positive sputum. In five of the 19 arrested cases, a period of relapse took place since their original chamber treatment. Arrest of the disease is now present in 12 of 19 patients.

An instructive recently treated case is presented in which progressive extension of disease took place during pneumoperitoneum and streptomycin therapy; the conspicuously downhill course was reversed by immobilizing lung chamber therapy in conjunction with administration of para-aminosalicylic acid.

Case 16: A 38-year-old white female. *History:* Onset of illness three months before admission, with cough, weight loss and fatigue. At the end of 20 months treatment with vitamin injections, x-ray film of lungs revealed evidence of far advanced pulmonary tuberculosis of the right upper lobe (Figure 8). Sputum was positive for acid fast organisms. Pneumoperitoneum was begun in a sanatorium. During the entire course of treatment she complained of digestive disturbances. Her only pulmonary hemorrhage occurred two weeks after initiation of pneumoperitoneum. Beginning six months prior to admission she received streptomycin, one gram daily for 120 days, because of laryngeal tuberculosis.

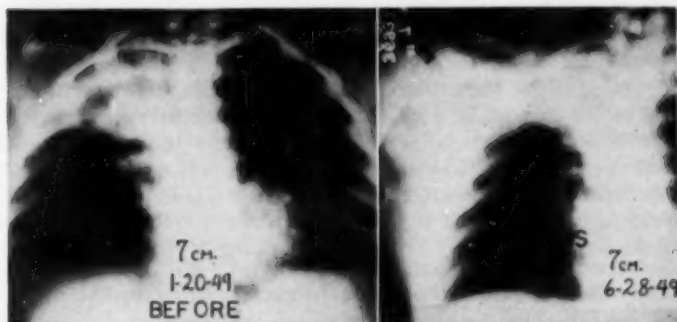


FIGURE 11

FIGURE 12

Figure 11: Planigraphic x-ray after reverse pneumoperitoneum revealed cavity in right upper lobe.—*Figure 12:* Planigraphic x-ray revealed disappearance of cavity in right upper lobe after 5 months chamber therapy.

Hoarseness improved during the first two months of therapy, but then gradually became almost as severe as prior to streptomycin therapy. In the last month of streptomycin treatment a spread to the left middle and lower lung fields was noted on x-ray inspection. The patient was then referred for immobilizing lung chamber therapy. *Physical examination* of the lungs revealed dullness over the upper third of the right lung with bronchial and cavernous breathing and egophony. *Stereoscopic and planigraphic x-ray films* of the lungs on admission revealed a shrunken right upper lobe containing a cavity measuring four centimeters in its greatest diameter and a fresh infiltration in the left middle and lower lung fields. *Course:* A reverse pneumoperitoneum accomplished the removal of 2,750 cubic centimeters of gas from the peritoneal cavity. Chamber therapy was begun, increasing gradually to 10 hours daily including Sundays. Para-aminosalicylic acid was administered, nine grams daily for three weeks of each month. Routine urine examinations and blood counts remained normal. The patient was afebrile. The erythrocyte sedimentation rate changed from 72 mm. in one hour to 25, and a weight gain of 8 pounds was recorded during the first three months. The first negative smear for acid fast organisms was obtained six weeks after chamber therapy was begun; four negative cultures and two negative guinea pigs were secured before a five months' course of treatment was terminated. The final x-ray films revealed clearing of the recent spread of infiltration into the left lower lobe and disappearance of the old cavity in the atelectatic area in the right upper lobe, as shown in stereoscopic and planigraphic films (Figures 9, 10, 11 and 12). Two months after leaving the hospital the patient was discovered to have a carcinoma of the cervix after a prolonged menstrual flow. Unfortunately, she began to drink excessively, was overactive, and the cavity reopened six months later.

The obvious extension of disease with pneumoperitoneum and streptomycin therapy illustrates the serious nature of this patient's condition when immobilizing lung chamber therapy was instituted. Para-aminosalicylic acid therapy was probably of help in clearing the infiltration in the left lower lobe that developed under streptomycin treatment. The disappearance of the cavity in the area of dense shadow in the right upper lobe, which had persisted for two years, could be ascribed to arrest of lung movement provided by the immobilizing lung chamber, since neither streptomycin nor PAS (in our experience¹⁸) has been found to be of value in persisting cavities of this kind in chronic pulmonary tuberculosis. Unfortunately, the overactivity and alcoholism associated with discovery of carcinoma of the cervix resulted in reopening of the cavity.

Technique of Operation of the Immobilizing Lung Chamber

The importance of the initial training period of the patient for a week or 10 days has become more and more apparent. In fact, failure to superintend the early management of cases treated with this method may result in failure to achieve continuous arrest of

lung movement in patients who would otherwise respond well to immobilizing lung chamber therapy. The patient who has had good supervision and training during the first 10 days generally manifests no signs of breathing during the remainder of treatment, not less than 10 hours a day for four to five months. Even though complete arrest of the disease may not have taken place during this period, it has seemed better to stop immobilizing lung chamber therapy in a few selected cases, and then, if considered desirable, to institute a second course four to six months, or even a year, later. The chamber now in use has been especially air-conditioned and has employed an alternation of pressure above and below the atmosphere.* A somewhat changed type of chamber in which 110 volt alternating current can be used is in process of development. The importance of providing a consecutive period of 10 hours during the day or night, interrupted only by meals, will be described.¹⁹

Discussion

The clinical evaluation of immobilizing lung chamber therapy in pulmonary tuberculosis can only be attempted by carefully appraising the results in an admittedly small number of cases. The patients selected were, in almost all instances, those in whom the previous course was either stationary or manifested progressive extension of the disease. Operative procedures would have been either impossible or hazardous in all except one or possibly two cases. Attentive observation of the course and character of cavity closure, as well as the reappearance of cavity when treatment was interrupted, has provided ample evidence that this type of lung rest has a specific influence on closure, collapse and healing of tuberculous cavities. Inspection of stereoscopic and planigraphic films during chamber therapy indicates that the cavity generally collapses in the lateral or side-to-side diameter. Since diaphragmatic movement exerts a pull in the vertical diameter, cavity closure by collapse of the walls laterally would appear to be easier than from below upward. In recent months the use of abdominal compression by a belt has been carried out during the period when the patient is out of the chamber at night. This procedure was adopted because of our observations above mentioned and because the studies on abdominal compression with a belt made by Gordon²⁰ seemed to be based on sound physiological and clinical evidence.

Although para-aminosalicylic acid was employed in four of the recently treated patients, streptomycin was used in only one case during six weeks of chamber therapy. In others previous treatment

*The chamber is manufactured by J. H. Emerson Company, Cambridge, Massachusetts.

with streptomycin had been carried out until the tubercle bacilli were resistant to the drug at the time of chamber treatment.

The employment of chemotherapy during the period of cavity closure would now appear to be a logical and justifiable procedure which might make less likely the occurrence of relapse under conditions of stress. We have hitherto avoided the use of streptomycin in order to demonstrate the effectiveness of lung immobilizing therapy alone in accomplishing closure and healing of tuberculous cavities. Since the technique of employing streptomycin and PAS together would now allow perhaps two months' administration without the development of resistance, the use of these drugs when the walls of the cavity were collapsing during chamber therapy would seem as justifiable as is the employment of chemotherapy in conjunction with surgical or other collapse procedures.

Clinical and physiological evidence now available concerning chamber-induced rest of the lungs would suggest that a more widespread use of this treatment is indicated, not only for advanced cases, but in patients manifesting less extensive disease. In fact, the trial of properly managed immobilizing lung chamber therapy in preference to pneumothorax and thoracoplasty might have the obvious advantages of inducing clinical recovery without impairment of lung function or structure, and without the risk attendant on other methods of collapse therapy.

The unique mental and physiologic benefits of ventilation without chest movement are revealed by the studies presented in this paper. The decrease in cardiac impact, the lowering of the pulse rate and blood pressure, the lessened excretion of potassium, the increase in serum potassium, the elevation of the T-wave and the indications of decreased total metabolic work, all point to a more restful functioning of the organism than is obtained by bed rest. Furthermore, no instance of spread of disease has happily taken place in our cases during the period of residence in the chamber.

The use of the pressure equalizing chamber for elimination of bronchial secretions, as well as for provision of an adequate gas exchange in the lungs, was recently provided by a change in the design and operation of this apparatus. A mechanically induced effective cough was obtained by introducing in the head end of the chamber, a valve which opened at the height of the cycle of positive pressure in 0.08 seconds. At the same time, a sudden application of an increased differential pressure on the chest and abdomen was initiated by closing the baffle more tightly around the neck. The differential pressure of 40 mm. Hg., in conjunction with an explosive release of pressure at the head end, resulted in elimination of bronchial secretions in patients with bronchiectasis,²¹ bronchial asthma and respiratory paralysis due to polio-

myelitis. The possible use of this technique in the drainage of retained muco-purulent material in patients with pulmonary tuberculosis, and perhaps especially in cases with cavity, may represent an additional therapeutic procedure in the management of this disease.

SUMMARY

1) In 19 of 29 cases of advanced pulmonary tuberculosis, arrest of disease took place as a result of immobilizing lung chamber therapy. The course of disease in these patients immediately prior to treatment either revealed a progressive extension of the tuberculous process after bed rest, pneumoperitoneum or streptomycin therapy, the reappearance of cavity after termination of pneumothorax, or failure of benefit from bed rest, pneumoperitoneum or pneumothorax.

2) Properly regulated immobilizing lung chamber therapy, in favorable cases, has a specific effect on collapse and healing of tuberculous cavities. The follow-up results reported in this paper indicate the incidence of relapse and of maintenance of clinical cure. In no instance in the series of cases observed over a period of 13 years did a spread of disease take place during immobilizing lung chamber treatment.

3) The physiological effects of living without voluntary breathing, i.e., lung ventilation without lung movement, appear related, at least in part, to the unique quality of bodily and mental rest initiated by elimination of excursions of the chest ordinarily employed in normal respiration.

4) The effects of residence in the immobilizing lung chamber, in cases in which complete arrest of chest movement is produced, include:

A) A marked decrease in cardiac impact as measured by the Dock ballistocardiograph. When this observation is interpreted in conjunction with the findings of an unchanged venous pressure, a decrease in pulse rate and blood pressure, the conclusion seems justified that the work of the heart is markedly reduced. In addition, the total energy consumption of the individual would appear to be strikingly diminished.

B) The period of residence in the immobilizing lung chamber is characterized by a decreased excretion of potassium in the urine and an increase in serum potassium. These biochemical responses to respiratory, mental and bodily rest would seem to be the result, at least in part, of a lessened stimulus to the adrenal gland. The T-wave of the electrocardiogram, i.e., T-1, T-2 and T-4, is elevated in these patients at the time when the serum K is increased. An additional but less likely explanation of the decreased elimination

of potassium may be, in part, a decreased total and renal blood flow, which appears to be present in these cases as a consequence of the lowering of the total metabolic needs.

5) Modifications in the technique of treatment now in progress may simplify and improve the results of immobilizing lung chamber therapy in the treatment of cavitary pulmonary tuberculosis.

6) A case of far advanced tuberculosis is described in which spread of disease took place during streptomycin and pneumoperitoneum therapy; the initial responses to immobilizing lung chamber therapy, in conjunction with administration of para-aminosalicylic acid, were (1) a favorable clinical reversal of the course; (2) clearing of the infiltrative spread; (3) disappearance of a large cavity in an area of chronic disease.

RESUMEN

1) En 19 de 29 casos de tuberculosis pulmonar avanzada se obtuvo el estacionamiento de la enfermedad mediante el tratamiento en la cámara de inmovilización del pulmón. La evolución de la enfermedad en estos pacientes, inmediatamente antes del tratamiento, reveló: (1) una extensión progresiva del proceso tuberculoso subsiguiente al descanso en cama, el neumoperitoneo o la estreptomycinoterapia, (2) la reaparición de cavernas después de terminarse el neumotórax o (3) la falta de beneficio alguno subsiguiente al descanso en cama, el neumoperitoneo o el neumotórax.

2) En casos favorables, el tratamiento en la cámara de inmovilización del pulmón, apropiadamente regulado, ejerce un efecto específico sobre el colapso y la cicatrización de cavernas tuberculosas. Los resultados de la observación subsecuente, que se comunican en este trabajo, indican la frecuencia de recidivas y del mantenimiento de la curación clínica. En ninguno de los casos de esta serie, observados a través de un período de 13 años, ocurrió extensión de la enfermedad durante el tratamiento en la cámara de inmovilización del pulmón.

3) Los efectos fisiológicos de vivir sin respiración voluntaria, esto es, ventilación pulmonar sin movimiento del pulmón, parecen estar relacionados, por lo menos en parte, con la singular cualidad del descanso mental y corporal iniciado por la eliminación de las excursiones del tórax ordinariamente empleadas en la respiración normal.

4) En casos en los que se produce el detenimiento completo de los movimientos del tórax, los efectos de residir en la cámara de inmovilización del pulmón incluyen:

A) Una notable disminución en el choque cardíaco medido por medio del balistocardiógrafo de Dock. Cuando se interpreta esta

observación conjuntamente con los hallazgos de una presión venosa inalterada, de una disminución del pulso y de la presión de la sangre, parece justificarse la conclusión de que se reduce apreciablemente el trabajo del corazón. Además, parece que disminuye notablemente el gasto total de energía del individuo.

B) El período de residencia en la cámara de inmovilización del pulmón se caracteriza por una disminución en la excreción de potasio en la orina y un aumento del potasio en el suero. Estas respuestas bioquímicas al descanso respiratorio, mental y corporal parecen resultar, por lo menos en parte, de una disminución del estímulo de la glándula suprarrenal. La onda T del electrocardiograma, esto es, T-1, T-2 y T-4, está elevada en esos pacientes durante el tiempo en el que está aumentado el potasio del suero. Otra explicación menos probable de la disminución de la eliminación de potasio puede ser, en parte, la disminución en la circulación total y renal que parece existir en esos casos como consecuencia del decremento en las necesidades metabólicas totales.

5) Es posible que las modificaciones en la técnica del tratamiento, que acutalmente se están llevando a cabo, simplifiquen y mejoren los resultados de la terapia en la cámara de inmovilización del pulmón en el tratamiento de la tuberculosis pulmonar cavitaria.

6) Se describe un caso de tuberculosis pulmonar muy avanzada en el que se propagó la enfermedad durante la estreptomycinoterapia y el neumoperitoneo. Las respuestas iniciales al tratamiento en la cámara de inmovilización del pulmón, junto con la administración del ácido para-aminosalicílico, fueron: (1) La favorable reversión clínica de la evolución; (2) el limpiamiento de la propagación infiltrativa; (3) la desaparición de una caverna grande en la zona de enfermedad crónica.

RESUME

1) Dans 19 cas de tuberculose pulmonaire avancée sur 29, le traitement par la chambre d'immobilisation pulmonaire a permis d'arrêter l'évolution de la maladie. C'était des malades chez lesquels, immédiatement avant que le traitement fût mis en oeuvre on avait constaté une extension progressive de la tuberculose, malgré cure de repos intégral, pneumopéritoine ou streptomycine, la réapparition d'une caverne après qu'on eût cessé le pneumothorax, ou l'échec de l'action du repos, du pneumopéritoine ou du pneumothorax.

2) La chambre d'immobilisation pulmonaire quand elle est convenablement appliquée, a, dans les cas favorables, une action spécifique de collapsus et de guérison sur les cavernes tuberculeuses. La statistique des résultats rapportée dans cette commu-

nication montre le pourcentage de rechutes et de guérisons cliniques persistantes. Dans tous les cas observés pendant 13 ans, il n'y a pas eu d'extension des lésions au cours même du traitement par la chambre d'immobilisation.

3) Ce traitement consiste au point de vue physiologique à permettre de vivre sans respiration volontaire, c'est-à-dire par ventilation pulmonaire sans mouvements thoraciques. Son action est essentiellement dominée par la valeur du repos physique et mental provoqué par l'absence des mouvements respiratoires habituels.

4) Les auteurs étudient les conséquences du séjour en chambre d'immobilisation dans les cas où l'arrêt complet des mouvements thoraciques a pu être obtenu:

A) Il y a une diminution importante de l'impulsion cardiaque prouvée par la ballistocardiographie de Dock. Comme il y a concurremment une pression veineuse inchangée et une diminution des pulsations et de la tension artérielle, on peut en conclure légitimement que le travail du coeur est considérablement réduit. De plus la consommation totale d'énergie de l'individu serait nettement inférieure à la normale.

B) Le séjour dans la chambre d'immobilisation est caractérisé par une diminution du potassium urinaire et une augmentation du potassium sanguin. Ces conséquences biochimiques du repos respiratoire total semblent au moins pour une part, être le résultat d'une excitation des surrénales. L'onde T de l'électrocardiogramme (T1-T2 et T4) est élevée chez les malades pendant la période où le potassium sérique est augmenté. A la rigueur on pourrait expliquer la diminution de l'élimination du potassium par une diminution de la masse sanguine totale et de la masse sanguine rénale. Cette diminution paraît être une conséquence ici de l'abaissement de l'ensemble des besoins métaboliques.

5) Des progrès dans la technique du traitement pourront simplifier et améliorer les résultats obtenus par la chambre d'immobilisation dans la tuberculose cavitair.

6) Les auteurs rapportent un cas de tuberculose très avancée avec dissémination apparue au cours de traitement par streptomycine et pneumopéritoine. L'action de la Chambre d'immobilisation associée à l'acide para-amino-salicylique a réalisé: (1) une évolution clinique favorable; (2) Un nettoyage de la dissémination; (3) la disparition d'une volumineuse cavité.

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Discussion

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Rest to the diseased pulmonary area still remains the corner stone upon which hope for recovery in chronic pulmonary tuberculosis is based. In recognition of this concept, Sunny View Sanatorium, a County institution of 70 beds in Central Wisconsin, installed three lung immobilizing chambers. Over a period of three years, 38 patients classified from minimal to pre-terminal have

accepted this type of therapy. The period of observation has been sufficient to enable us to evaluate to a reasonable extent the usefulness of this method for intensifying the application of therapeutic rest.

That the chamber provides the means of arresting all respiratory movements has been well demonstrated. Some patients adjust quickly, others require more time, while an occasional one, particularly belonging to the older group, fails entirely. At Sunny View 1,500 hours of lung immobilization, divided into two daily periods of four hours each, is tentatively set as constituting a course of chamber treatment. In no instance has harm resulted and patients find it a rather pleasant, relaxing, experience.

Of the 38 patients reported on, our two minimal cases secured an apparent arrest after 992 and 1,116 hours respectively. Our three moderately advanced cases with cavity formation cleared after 943; 1,042 and 1,500 hours of lung immobilization; seven far advanced bi-lateral cavity cases closed their cavities and became sputum negative on concentrate and culture of gastric washings after from 1,170 to 2,374 hours of chamber residence. Seven other far advanced cases improved sufficiently to change their lesions from surgically non-acceptable to acceptable risk cases. One patient, having difficulty converting the sputum on bed rest following thoracoplasty responded after a short period of lung immobilization. Five patients, unfortunately, voluntarily discontinued chamber treatments after showing definite improvement on chest x-ray films and laboratory findings. Six others are now undergoing lung immobilization with encouraging findings, while the remaining number of the 38 reported were apparently pre-terminal for which nothing could be done.

We have noted the following clinical responses: 1) Subjective symptoms are brought under control in a shorter period of time. 2) Pleuritic pain ceases at once following lung immobilization. 3) Cavity closure is definitely favored and sputum conversion hastened.

Our impressions on the usefulness of the immobilizing chamber in publicly operated and financed sanatoriums are as follows: 1) The chamber offers in recoverable cases the means of materially reducing the period of sanatorium stay. 2) Lung immobilization will increase the diseased resisting potential in marginal cases, thus offering a last opportunity for recovery. 3) Lung immobilization therapy may obviate the necessity for major chest surgery in some cases and prepare others for operative procedures with less surgical risk. 4) Lung immobilization treatment does not preclude the associated use of additional conventional procedures in our efforts to save human lives from chronic pulmonary tuberculosis.

Interesting Cardiovascular Abnormalities Discovered on Mass Chest Roentgen Surveys*

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The purpose of this presentation is to demonstrate a group of interesting cardiovascular abnormalities rather than to give a detailed statistical analysis of the prevalence of these conditions in mass roentgen surveys. However, a brief reference to the literature is in order to emphasize the fact that cardiovascular abnormalities of clinical significance are found with appreciable frequency during the course of such surveys.

The literature contains few reports on the prevalence of abnormalities of the cardiovascular silhouette on routine roentgen surveys. The reason for this is apparent. The surveys, as a rule, are directed towards the discovery of previously undetected pulmonary tuberculosis. Neither funds nor personnel are available for the follow-up analysis of the cardiac and vascular abnormalities simultaneously discovered. Perhaps another reason for the paucity of such studies is that the vast majority of cardiac lesions thus detected, particularly among older age groups, are of the hypertensive and arteriosclerotic types, and are not amenable to definitive therapeutic measures or in dire need of treatment.

Thompson and Jellen¹ found abnormalities of the heart in 2 per cent of "4 x 5" inch miniature films read among industrial groups in Los Angeles County. On 1,696 films suspicious cardiac disorders were interpreted and 1,147 of these were further studied. Clinical heart disease was found in 68.9 per cent of this group. Of those persons with clinical heart disease 62.2 per cent had no previous knowledge of the disease. Thus about 1 per cent of all persons surveyed in this industrial program had heart disease of which there was no previous knowledge.

Flanchers², in Iowa, found 0.8 per cent of a total of 41,848 high school students surveyed, with suspicious heart lesions. 92 of these students were referred to their private physicians for examination. Of this group, 55 per cent were found to have heart disease. In about half of these, the heart disease was not previously known. A number of this group of high school children undoubtedly could be benefitted by the discovery of their cardiac lesions.

Melamid and Fidler³, in 3,626 routine chest roentgenograms on

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hospital admissions, found the heart abnormal in size and contour in 4.7 per cent, and aortic abnormalities in 3.4 per cent of cases.

Green⁴ reported a study of 22,219 consecutive individuals on the home relief rolls in the Harlem area of New York City. This study was conducted by the Bureau of Tuberculosis of the New York City Department of Health and was reported in the Supplement to the American Review of Tuberculosis in 1940. Of the total of 22,219 persons studied 71.2 per cent were Negroes, with an average age of 35.7 years; 18.6 per cent were white with an average age of 36.3 years. Race was not stated in 10.2 per cent of the group. Of the population 42.2 per cent was male and 57.8 per cent was female. The survey material used at that time was 14 x 17 inch paper film at four foot target film distance. Of the original 22,219 people examined 1,652 were considered to have abnormal cardiac silhouettes. Only 1,008 of this group reported for further study of whom 814 or 80.8 per cent were found by history and physical examination to have organic heart disease. Of these 814 people, 564 or 69.3 per cent were unaware that they had heart disease. The remainder already were under medical supervision. Of the 644 patients in the same group who did not respond for further examination, it is logical to assume that 80.8 per cent were cardiacs. Thus the probable prevalence was 1325 out of the original 22,219, an incidence of 6 per cent of the population surveyed.

Of the 564 who were unaware that they had heart disease, the most common types were:

	Per cent
1. Hypertensive and arteriosclerotic heart disease	- 63.1
2. Luetic heart disease	- 22.7
3. Rheumatic heart disease	- 12.2
4. Congenital heart disease	- 0.3
5. Hyperthyroid heart disease	- 0.3
6. Heart disease of unknown etiology	- 0.5

The high incidence of luetic heart disease in this group was undoubtedly due to the prevalence of syphilis in the particular group studied (five times that in the general population). The high prevalence of hypertensive, arteriosclerotic heart disease is also due to the fact that Negroes have a higher incidence of this type of heart disease than do whites. Double etiology was found as follows:

Among the patients with rheumatic heart disease 12.3 per cent had a positive Wassermann reaction. They also showed dilated aortas with or without aortic insufficiency. The diagnosis was Rheumatic and Syphilitic Heart Disease.

Among the patients with hypertensive arteriosclerotic heart disease 2.8 per cent gave a history of rheumatic fever and had mitral stenosis and insufficiency.

The contention of the cardiologist that roentgen interpretation alone plays but a small part in the diagnosis of cardiovascular disease undoubtedly is true. However, the few brief references to the literature serve to show that there is an important correlation between abnormalities of the cardiovascular silhouette on survey roentgenograms and clinically significant heart disease found on further examination.

The cases to be presented constitute but a small fraction of the lesions found on routine survey studies of various segments of the population conducted by the Bureau of Tuberculosis:

Case 1: Right aortic arch and hypertensive cardiovascular disease.

F. H., age 52 was a white female school teacher whose x-ray film of the chest was taken during a routine survey of teachers. When admitted to the clinic she had no complaints but was under treatment for hypertension and enlarged heart. Her blood pressure was 180/120. X-ray film of chest revealed an enlarged left ventricle and a dilated aorta. A smooth convex density was seen in the right superior mediastinum and there was no aortic arch seen on the left side. Figures 1 and 2 reveal displacement of barium filled esophagus characteristic of right aortic arch.

Case 2: Coarctation of the aorta and rheumatic heart disease.

J. G., age 30, white male had rheumatic fever and heart disease since age of 19. He had no complaints. Physical examination revealed systolic and diastolic murmurs at the cardiac apex. A diastolic murmur was heard over the aortic area and in the second interspace to the left of

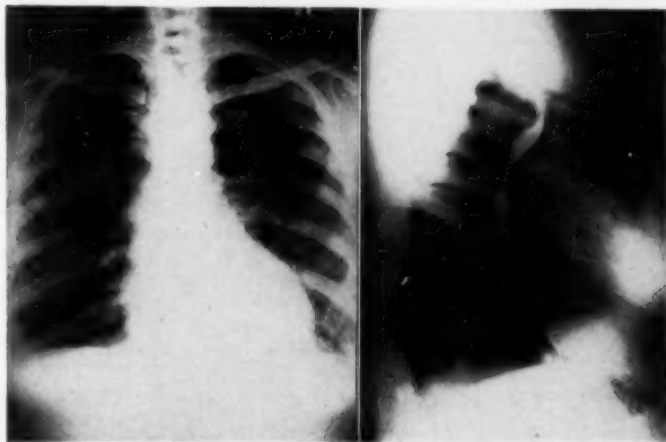


FIGURE 1

FIGURE 2

Figure 1, Case 1: Postero-anterior projection. Enlarged left ventricle and dilated aorta. Note smooth convex density in right superior mediastinum (arrow), absence of the shadow of the aortic arch on the left side and displacement of barium filled esophagus to the left.—Figure 2, Case 1: Right lateral projection. Note displacement of barium filled esophagus anteriorly by right aortic arch.

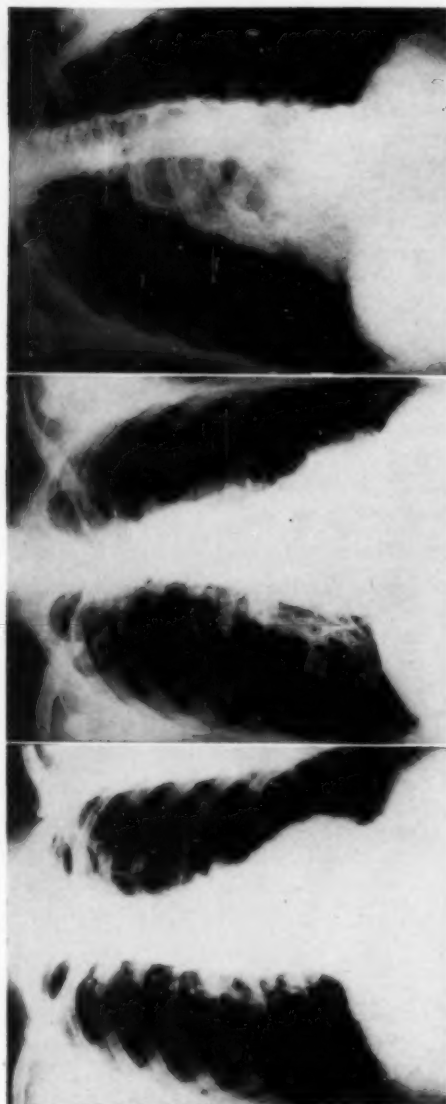


FIGURE 3

FIGURE 4

FIGURE 5

Figure 3, Case 2: Postero-anterior projection. Note notching of the inferior borders of the posterior segments of the ribs on both sides. The shadow of the aortic arch is extremely small.—Figure 4, Case 3: Note aneurysmal dilatation of the aorta with extensive calcification (arrow).—Figure 5, Case 3: Left oblique projection. Note extensive aneurysmal dilatation of the aorta with calcification.

the sternum. Blood pressure 154/96 in the upper extremities and not obtainable in the lower extremities. His survey film had revealed the notching of the ribs characteristic of coarctation of the aorta (Figure 3).

Case 3: Aneurysmal dilatation of the aorta with calcification.

H. N., age 53, white male. When seen, this man had no complaints and examination of his chest revealed no abnormal findings. He had been treated for syphilis many years previously. His chest x-ray film revealed aneurysmal dilatation of the aorta with extensive calcification (Figures 4 and 5).

Case 4: Huge aneurysm of the aorta.

V. Z., age 63, white male had no complaints. History of incomplete anti-leptic therapy 25 years previously. Blood pressure 162/84. Figure 6 reveals huge aortic aneurysm.

Case 5: Anomalous pulmonary vessel.

D. W., 36 year old Negress; housewife. No complaints. Examination of the chest revealed no abnormal findings. Survey chest x-ray film had revealed a sausage shaped density in the right lower lung field Figure 7. Angiocardiography Figure 8, revealed an anomalous vessel, probably a large vein, in the base of the right lung.

Case 6: Dextrocardia with situs inversus.

J. S., a 22 year old white male store clerk Figure 9.

Case 7: Congenital heart disease.

K. C., 21 year old white female who complained of moderate dyspnea on exertion. When she was 19 months old she had pneumonia. At that time the attending physician informed her mother that the patient had been born with an abnormal heart. There was no history of cyanosis. Physical examination revealed normal growth and development. There was no cyanosis and no clubbing. The point of maximum apical cardiac impulse was in the fourth left intercostal space within the midclavicular line. There was a short systolic thrill along the left sternal margin. A long, loud, systolic murmur was heard with greatest intensity in the third and fourth intercostal spaces adjacent to the left sternal border. A systolic murmur was heard over the base of the heart and in the interscapular area. Expiratory rhonchi were elicited over the right mid lung field posteriorly. Roentgenograms of the chest revealed marked enlargement of the right side of the heart with probable partial obstruction of the right upper lobe bronchus producing obstructive emphysema (Figures 10 and 11).

Clinically this patient had a congenital heart abnormality which would require further specialized cardiac investigation for accurate interpretation.

Case 8: Rheumatic heart disease.

J. K., a 23 year old white, unemployed seaman whose cardiac lesion was discovered on a routine chest roentgenogram when he was drafted for military service. He had no symptoms. There was no history of joint pains, fever or sore throat. Physical examination revealed presystolic and systolic murmurs at the cardiac apex with a snapping first sound. There was a systolic apical thrill. The cardiac rate was 100, the rhythm was regular with an occasional premature ventricular contraction. Blood pressure 142/90. Roentgen inspection of the chest revealed an extensively enlarged heart of mitral configuration with congestive pulmonary charges, Figure 12.

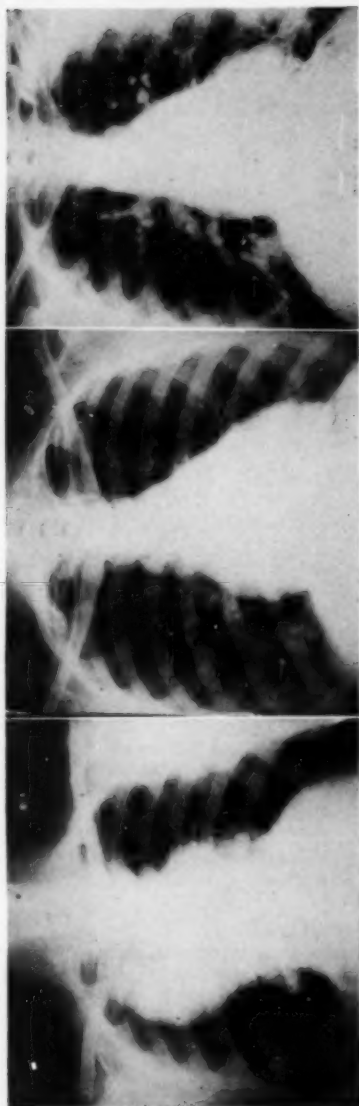


FIGURE 6

FIGURE 7

FIGURE 8

Figure 6, Case 4: Huge aneurysm of aorta. Note calcification in wall of aneurysm (arrow).—Figure 7, Case 5: Sausage shaped density in right lower lung field (arrow).—Figure 8, Case 5: Angiocardiogram (courtesy of Dr. Henry K. Taylor). Anomalous vessel, probably large pulmonary vein (arrow).

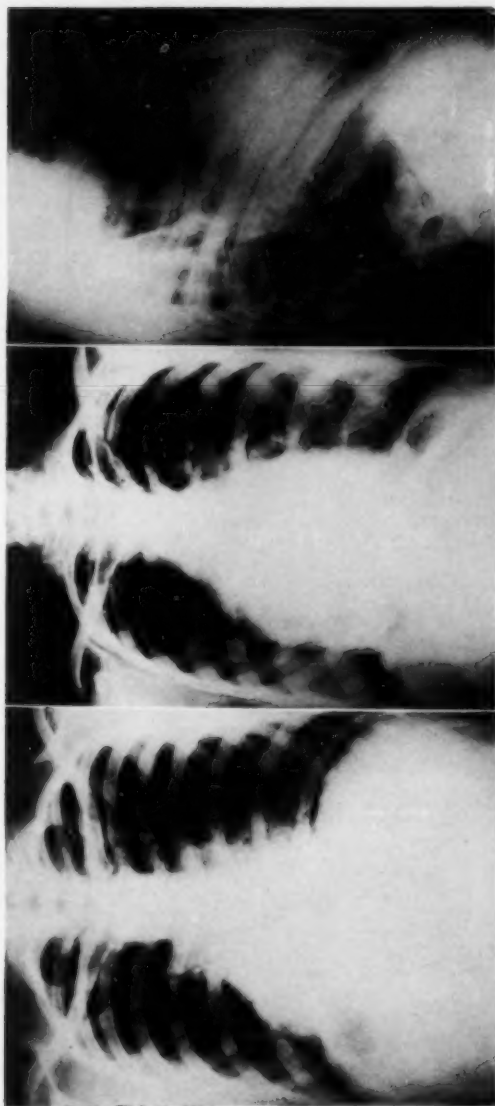


FIGURE 9

FIGURE 10

FIGURE 11

Figure 9, Case 6: Postero-anterior projection. Dextrocardia with situs inversus. — Figure 10, Case 7: Postero-anterior projection. Marked enlargement of right side of the heart, involving the right auricle and right ventricle. The right upper lung field reveals increased illumination, absence of pulmonary markings and widening of the intercostal spaces. These findings suggest obstructive emphysema probably due to partial obstruction and upward displacement of the right upper lobe bronchus by the enlarged heart. — Figure 11, Case 7: Right lateral projection. Reveals marked cardiac enlargement.

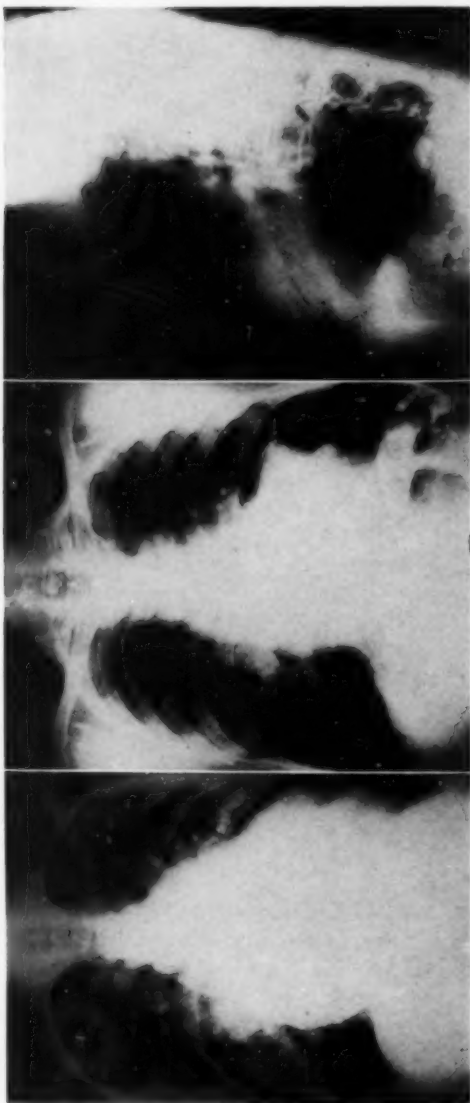


FIGURE 12

FIGURE 13

FIGURE 14

Figure 12, Case 8: Postero-anterior projection. Marked cardiac enlargement with mitral configuration. Note small aortic shadow, extensive bulge in region of the pulmonary artery and extensive enlargement of heart to right and to left. There is severe engorgement of both hilar areas and congestive changes are present in both lungs.—*Figure 13, Case 9:* Aneurysmal dilatation of the left ventricle (arrow). Nodular silicosis also present (arrow).—*Figure 14, Case 8:* Left lateral projection. Large circumscribed aneurysm of wall of left ventricle (arrow).

Case 9: Aneurysm of left ventricle.

W. C., a 61 year old white male. When recalled for examination because of findings on routine chest x-ray film this man had no complaints. He specifically denied dyspnea, cough or weight loss. He had no recollection of severe substernal or epigastric pain. There was no history of sudden weakness, syncope, nausea or vomiting. He had worked as a hard coal miner from 1906 to 1921 and was told that he had silicosis following an x-ray examination of his chest in 1940. Physical examination revealed an accentuated second aortic sound. Blood pressure 140/98. X-ray studies revealed an aneurysm of the wall of the left ventricle and nodular silicosis, Figures 13,14. The x-ray taken in 1940 was secured for comparison. The aneurysm of the left ventricle was not present at that time (seven years previously).

Case 10: Calcification of the pericardium.

M. I., a 21 year old Puerto Rican female had no complaints. There was no history of rheumatic fever, pneumonia or tuberculosis. Examination of the chest revealed no abnormal finding. The heart sounds were of good quality. There was no intercostal systolic retraction. X-ray film of the chest revealed extensive calcification of the pericardium, Figures 15 and 16.

Thanks are expressed to Mr. Valentin Gill of the Bureau of Tuberculosis, Department of Health, City of New York, who prepared the photographic reproductions of the original roentgenograms.

SUMMARY

- 1) The prevalence of cardiovascular abnormalities on routine chest roentgen surveys varies from 2 to 6 per cent.
- 2) These variations no doubt are due to differences in age and race among the different segments of population surveyed.

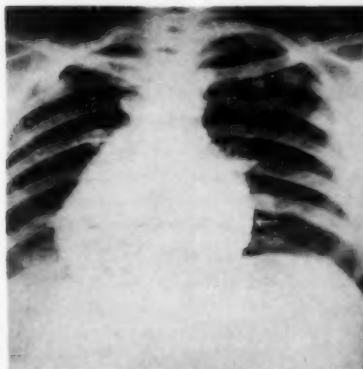


FIGURE 15

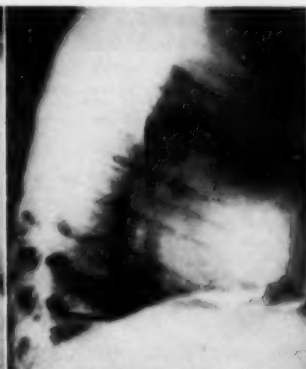


FIGURE 16

Figure 15, Case 10: Extensive calcification best seen along left cardiac border.
Figure 16, Case 10: Left lateral view showing extensive calcification of the pericardium.

3) More than 50 per cent of abnormalities of the cardiovascular silhouette discovered on routine chest roentgen surveys are found to be due to organic disease on subsequent examination.

4) This correlation between roentgen and clinical findings is an extremely important one particularly in conducting survey studies among children and young adults. A large percentage of patients thus discovered may benefit by recent advances in cardiovascular therapy.

RESUMEN

1) La frecuencia de anomalías cardiovasculares en catastros roentgenográficos torácicos rutinarios varía del 2 al 6 por ciento.

2) Estas variaciones se deben, indudablemente, a diferencias en edad y raza entre los diferentes segmentos de la población que fueron estudiados.

3) En exámenes subsiguientes se ha comprobado que más de 50 por ciento de las anomalías de la silueta cardiovascular que se descubren en catastros roentgenográficos torácicos rutinarios se deben a enfermedad orgánica.

4) Esta correlación entre los hallazgos roentgenográficos y clínicos es muy importante, especialmente cuando se realizan estudios sistemáticos entre niños y adultos jóvenes. Un alto porcentaje de los pacientes así descubiertos pueden disfrutar de los recientes avances en la terapia cardiovascular.

RESUME

1) La découverte d'anomalies cardio-vasculaires lors des examens radiologiques systématiques du thorax varient dans une proportion de 2 à 6 pour cent.

2) Ces variations sont indiscutablement en rapport avec les différences d'âge et les différences ethniques des individus examinés.

3) Plus de 50 pour cent des anomalies de l'ombre cardio-vasculaire ainsi découvertes se révèlent, aux examens ultérieurs, être en rapport avec une infection organique.

4) Cette relation entre les constatations radiologiques et les. Quand il s'agit des examens systématiques d'enfants ou de jeunes adultes, un pourcentage important de malades ainsi déposés pourra bénéficier des progrès qui ont été récemment réalisés dans la thérapeutique des affections cardio-vasculaires.

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Arteriovenous Aneurysm of the Lung*

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Arteriovenous aneurysm of the lung is a rare anomaly of the pulmonary circulation in which a large vascular cavity, incompletely divided by septa, is in direct communication with one or two dilated branches of the pulmonary artery and vein. A proportion of the venous blood in the pulmonary artery passes through the aneurysmal sac to the pulmonary vein and, therefore, fails to be aerated in the lungs. Consequently, the blood is returned to the systemic circulation incompletely saturated with oxygen. The arterial hypoxia gives rise to secondary polycythaemia, cyanosis, clubbing of the fingers, and dyspnoea on effort.

When a young person presents the above combination of signs, without evidence of heart disease, and a radiograph of the chest reveals a discrete density in the lung, a pulmonary arteriovenous aneurysm should be suspected.

The single case reported here is presented chiefly because of the interest in this relatively rare condition, and because it is the second case to be reported in which local resection has been done successfully in both sides of the chest.

Case Report

G.S., a 34-year-old woman, was referred to the Out-Patient Department on November 30, 1948, because of attacks of vertigo. She was cyanosed, her fingers were clubbed, and a loud systolic murmur was heard over the left lower chest anteriorly. A chest radiograph showed a small density adjacent to the cardiac silhouette on each side. She was admitted to the hospital for investigation of these findings.

She had always noticed shortness of breath on moderate effort, such as climbing one flight of stairs, but otherwise felt well till May 1947, when she began to tire easily and to have attacks of vertigo. The spells of dizziness were sudden in onset, variable in degree and lasted a day or two; during the attacks the room seemed to rotate, and the vertigo was greatly aggravated by movement of the head. At the onset of one attack she fell to the ground, vomited, and had to be helped to bed.

Since October 1948, there had been a constant sensation of slight numbness on the right side of the face. Three spells of inability to speak, each lasting a few seconds, had occurred.

Past history was negative except for an attack of acute mastoiditis on the right side at the age of 12 years, for which a mastoidectomy was done. There was no subsequent discharge from the ear.

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On examination, the patient looked well although there was slight cyanosis of the skin and lips. Two small haemangiomas were seen in the lower lip, each about two millimetres in diameter; they blanched on pressure. Similar lesions were noted in the tip of the tongue and under the nail beds of two of the fingers. The fingers were slightly clubbed. A loud systolic bruit was heard over the left anterior chest at the level of the fourth interspace in the mid-clavicular line; it was most intense at the end of a deep inspiration when a thrill could be felt in the same area. A distant systolic bruit was also heard just to the right of the sternum in the fifth interspace. The heart was not enlarged; there were no heart murmurs. The blood pressure was 100 mm. Hg. systolic and 70 mm. Hg. diastolic. Physical examination was otherwise negative. Urinalysis was negative. The haemoglobin was 108 per cent, red cell count 6,600,000, white cell count 7,400, and differential count normal; haematocrit was 46 per cent. The arterial oxygen saturation of femoral artery blood was 87 per cent.

Radiography of the chest in the posterior-anterior and left-lateral directions showed the heart to be normal in size and shape. An area of increased density about three centimetres in diameter, irregular in shape and sharply demarcated, was seen in the left anterior lung field just lateral to the margin of the heart at the level of the fourth interspace. A similar but smaller density (poorly visualized in the reduced film) was present near the right cardiophrenic angle (Figure 1). A radiograph was taken during forced expiration with the glottis closed, and also during forced inspiration with the airway closed. The densities described above became smaller when the intrathoracic pressure was increased, and larger when it was decreased (Figure 2). Laminagrams indicated that the lesion in the left lung was located in the lingula and that the one in the right lung was in the middle lobe.

A chest radiograph, taken four seconds after the injection of 30 cubic centimetres of 70 per cent diodrast into the left basilic vein, demonstrated the filling of both above described densities, thus establishing

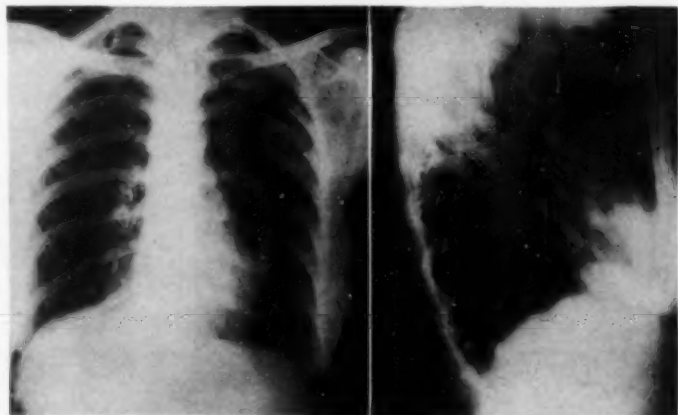


FIGURE 1: Posterior-anterior and lateral radiographs showing a density in the lingula of the left upper lobe and one in the right middle lobe.

the diagnosis of arteriovenous aneurysms of the lungs (Figure 3). On December 28, 1948, a local excision of the aneurysm of the right middle lobe was performed by one of us (R.M.J.) and on May 18, 1949, the aneurysm in the lingula of the left upper lobe was likewise locally excised.

Dr. W. L. Robinson's pathological report of the specimen removed from the right middle lobe reads in part: "This specimen consisted of a soft, somewhat fluctuant mass measuring 6 x 3 x 3.5 centimetres. All surfaces but one, the attached surface, were covered by visceral pleura. Running over its free surface were some tortuous purplish vessels, 0.8 centimetres in diameter. After preservation in Kaiserling solution, the specimen was injected with gelatin through the arteries. The gelatin was allowed to harden. The following day the specimen was bisected and was seen to be composed of one aneurysmal dilatation of a vessel measuring 5 x 3 centimetres, with a small communicating dilatation 1.5 centimetres in diameter; two vessels communicated with the larger aneurysm. The wall of the large saccular aneurysm, seen in the gross, was composed of a thick layer of collagenous connective tissue lined by a single layer of endothelial cells. The surrounding lung parenchyma appeared somewhat atelectatic but was otherwise normal. Elastic tissue stains demonstrated that the wall of this cavity and the entering artery possessed fairly large amounts of elastic tissue." The pathological diagnosis was "arteriovenous aneurysm of the lung." The report of the specimen removed from the left upper lobe was similar to the above.

The post-operative course was uneventful. When seen in March 1950, 10 months after the second operation, the patient was feeling well and the symptoms noted prior to the operations had disappeared. She had had no attacks of vertigo or spells of inability to speak; the numbness on the right side of the face had gradually cleared; she did not tire

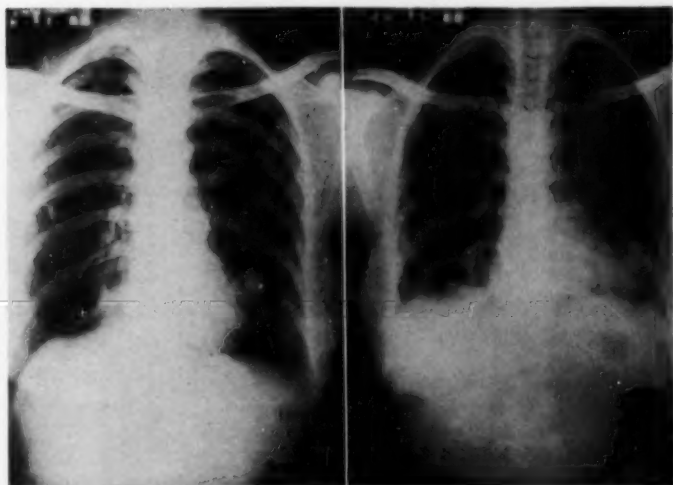


FIGURE 2: Radiographs taken during forced expiration, on the left, and inspiration with the upper airway closed, on the right.

easily; there was no shortness of breath on moderate effort; there was no cyanosis; and the fingers were normal in shape. The blood counts had remained normal since immediately after operation, and the arterial oxygen saturation was 94.6 per cent.

Review of the Literature and Discussion

Synonyms in the literature for arteriovenous aneurysm of the lung are arteriovenous fistula and cavernous haemangioma. We agree with Barnes, Fattle and Pryce²⁷ that arteriovenous aneurysm is a better term for the condition than haemangioma, since the lesion is a developmental malformation and not a true tumour.

Wilkins¹ was the first, in 1917, to report the clinical and pathological findings in a case of arteriovenous aneurysm of the lung. The patient was a young woman who died of an intrathoracic haemorrhage as a result of a rupture of the lesion. Rodes,³ in 1938, was the first to describe polycythaemia as a feature of the disease. Smith and Horton,⁵ in 1939, reported the first case in which the clinical diagnosis of arteriovenous fistula of the lung was made. In 1942, Hepburn and Dauphinee⁶ reported the first

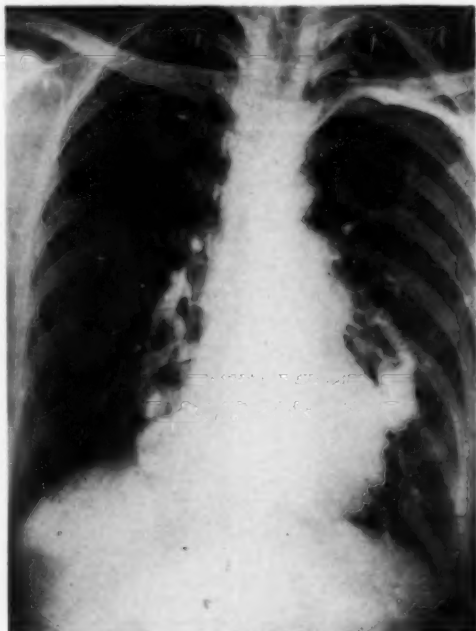


FIGURE 3: Angiocardiograph.

case to be cured by pneumonectomy, thus proving the causal relationship of the pulmonary arteriovenous shunt to the polycythaemia, cyanosis, clubbing of the fingers and dyspnoea. The pneumonectomy in this case was performed by Shentone and Janes. Since then four more cases have been diagnosed at this centre, which suggests that the disease may not be as rare as was formerly thought. Four of the above five cases were cured by excision therapy.

Table I presents a summary of important findings in 40 cases: 39 previously reported and the case reported here. The ages of the patients varied from one day to 51 years, but nearly half of them were in the third decade. Symptoms usually began in the first or second decade, and usually progressed slowly; they are listed in Table I in the order of frequency from left to right. Cyanosis and clubbing of the fingers were noted in about 80 per cent of patients; dyspnoea on slight or moderate effort was nearly as frequent. Polycythaemia was present in over 80 per cent of the cases in which the red cell count was recorded.

This combination of cyanosis, clubbing of the fingers, dyspnoea and polycythaemia is the result of reduced arterial oxygen saturation which ranged from 70 to 90 per cent (normal 95 per cent) in the cases in which it was measured. The impairment of respiratory function is due primarily to the pulmonary arteriovenous shunt but there may also be a reduction in the blood flow through the pulmonary capillary bed. The absence of cardiac enlargement in nearly all cases and the estimated normal cardiac output in the case reported by Maier, et al.²⁵ suggest that there is usually no increase in cardiac output in this condition. If such is true, the flow of blood through the arteriovenous fistula must result in a subnormal flow through the pulmonary capillary bed. Baker and Trounce²⁸ described a patient with slight cardiac enlargement in which the estimated cardiac output was increased but, even in their case, there was evidence that the pulmonary capillary circulation was below normal and that a large volume of blood was passing through the aneurysm.

A bruit in the chest over the site of the aneurysm was described in nearly two-thirds of the cases; it was usually systolic in time but in a few patients was continuous. There was an increase in the intensity of the sound at the end of a deep inspiration in a few instances.

About half the patients had cerebral symptoms such as dizzy spells, transient weakness or numbness, brief spells of inability to speak, or attacks of unconsciousness or convulsions. The cerebral symptoms probably are the result of transient periods of increased cerebral anoxia, since they disappeared following excision of the

TABLE I
Summary of Findings in Forty Cases of Arteriovenous Aneurysm
Reported in the Literature

Case	Year	Age Years	Cyanosis	Clubbing of Fingers	Dyspnoea	Bruit in Chest	Cerebral Symptoms	Haemangiomas of Skin or Mucosa	Haemoptysis	Red Cell Count Millions
1	1917 ¹	23	+	+	+	+	0	+	+	
2	1936 ²	1 day	0	0	0	0	0	0	+	
3	1938 ³	25	+	+	+	0	0	0	+	7.5
4	1939 ⁴	16	0	0	+	0	0	0	0	
5	1939 ⁵	40	+	+	+	+	+	0	0	6.4
6	1942 ⁶	23	+	+	+	0	+	0	0	9.6
7	1943 ⁷	22	+	+	+	0	+	+	0	11.4
8	1944 ⁸	30	+	0	+	+	0	+	+	
9	1944 ⁹	24	+	+	0	0	0	+	0	7.2
10	1944 ¹⁰	24	+	+	0	+	0	0	0	7.5
11	1945 ¹¹	45	+	+	+	+	+	0	+	5.8
12	1945 ¹²	41	+	+	+	+	+	+	0	8.3
13	1946 ¹³	17	+	+	+	+	0	0	0	7.7
14	1946 ¹⁴	30	+	+	+	+	0	0	0	4.3
15	1947 ¹⁵	29	+	+	+	+	+	+	+	6.4
16	1947 ¹⁵	25	+	+	+	+	0	0	+	
17	1947 ¹⁵	20	+	+	+	+	+	0	0	7.6
18	1947 ¹⁶	27	+	+	+	0	+	+	0	8.2
19	1947 ¹⁷	29	+	+	+	+	+	+	0	6.8
20	1947 ¹⁸	32	+	+	0	0	0	0	0	7.0
21	1947 ¹⁹	23	+	+	0	0	0	0	0	8.7
22	1947 ²⁰	27	+	0	0	0	0	0	0	
23	1947 ²⁰	21	+	+	+	0	+	+	0	6.5
24	1947 ²¹	33	0	0	0	+	+	+	0	
25	1947 ²²	44	+	+	+	0	0	0	+	6.3
26	1947 ²²	33	0	0	0	+	0	0	0	
27	1948 ²³	29	+	+	+	+	+	+	0	6.5
28	1948 ²³	25	+	+	+	+	+	+	+	5.4
29	1948 ²⁴	51	+	+	+	+	+	+	0	
30	1948 ²⁵	20	+	+	+	+	0	0	0	6.9
31	1948 ²⁶	21	0	0	0	0	0	0	0	5.1
32	1948 ²⁶	13	+	+	+	0	0	0	0	6.4
33	1948 ²⁷	17	+	+	+	+	+	0	0	7.8
34	1948 ²⁷	42	+	+	+	0	0	+	+	9.5
35	1949 ²⁸	27	+	+	+	+	+	+	0	7.5
36	1949 ²⁸	13	+	+	0	+	0	0	0	7.2
37	1949 ²⁹	36	0	0	0	+	0	0	+	6.1
38	1949 ³⁰	42	+	+	+	+	+	0	0	7.4
39	1949 ³⁰	42	0	+	0	+	+	+	0	4.4
40	1950*	34	+	+	+	+	+	+	0	6.6

*Case reported in present paper.

pulmonary arteriovenous aneurysm. Moreover, in the cases coming to autopsy, no cerebral lesions were described. Similar symptoms occur in patients with the cyanotic type of congenital heart disease.

Small haemangiomas of the skin or of the mucous membranes of the nose or oral cavity were noted in 40 per cent of the cases. The association of these lesions with the pulmonary arteriovenous aneurysm suggests a common defect in the structure of blood vessels which is probably congenital in nature.

Haemoptysis occurred in about one-quarter of the cases reported and, in a few instances, caused the death of the patient. The number of aneurysms in the lungs varied from one to five in different patients and were multiple in the majority of cases.

Differential Diagnosis

The most common erroneous diagnosis was congenital heart disease of the cyanotic type. Cyanosis, clubbing of the fingers, dyspnoea on effort and polycythaemia in a child or young adult suggests this condition but the normal size and shape of the heart, the absence of heart murmurs and the radiographic finding of a density in the lung near the hilum should lead to the correct diagnosis.

Pulmonary tuberculosis was suspected in some patients who had haemoptysis in association with a radiographic density in the lung. Clubbing of the fingers and polycythaemia are not features of pulmonary tuberculosis, and the circumscribed opacity in the lung differs from the shadow usually seen in an active inflammatory lesion.

Bronchiectasis may be suggested by the association of haemoptysis and clubbing of the fingers but the absence of expectoration makes such a diagnosis improbable, and a bronchogram should exclude it.

Polycythaemia rubra vera was wrongly diagnosed in some instances because of the presence of polycythaemia and cyanosis. Pulmonary densities, transient in nature, have been described in such patients, but this disease is improbable in the absence of splenomegaly and the presence of clubbing of the fingers and a normal white cell count. In case of doubt the roentgenograms should be repeated in a few weeks when the shadows associated with polycythaemia vera will have changed or disappeared.

Treatment

The symptoms of arteriovenous aneurysm of the lung are usually slowly progressive and finally may incapacitate the patient. Moreover, death may result from a rupture of the aneurysm into a bronchus or into the pleural space, as was described in three of

the 39 cases reported in the literature. Therefore, surgical excision of the pulmonary lesion or lesions should be considered in all cases as it offers the only means of cure.

SUMMARY

A case is reported of bilateral arteriovenous aneurysm in the lungs of a young woman who had always been short of breath on moderate effort and who came to the hospital because of attacks of vertigo. Examination disclosed slight cyanosis, clubbing of the fingers and systolic bruits over the sites of the aneurysms which were demonstrated radiographically. Bilateral local excision of the aneurysms resulted in complete relief of symptoms.

The literature of the subject is reviewed, particularly in reference to symptoms and signs, and the pathogenesis, diagnosis and treatment are discussed.

RESUMEN

Se comunica un caso de aneurismas arteriovenosos bilaterales de los pulmones de una joven que siempre había sufrido disnea después de esfuerzos moderados y que vino al hospital por motivo de un acceso de vértigo. El examen reveló una cianosis ligera, ensanchamiento de la punta de los dedos y ruidos sistólicos sobre los sitios de los aneurismas, que fueron demostrados radiológicamente. La excisión local bilateral de los aneurismas resultó en el alivio completo de los síntomas.

Se repasa la literatura sobre esta materia, particularmente con referencia a los síntomas y signos, y se discute la patogenia, el diagnóstico y el tratamiento.

RESUME

Les auteurs rapportent un cas d'anévrysme artérioveineux bilatéral du poumon. Il s'agit d'une jeune femme qui a toujours eu de la dyspnée au moindre effort, et qui entra à l'Hôpital à la suite d'une crise de vertiges. L'examen montre l'existence d'une légère cyanose, d'un hippocratisme digital, et d'un souffle systolique au niveau des anévrysmes, que la radiographie met clairement en évidence. L'exérèse de ces anévrysmes entraîna la disparition complète des symptômes.

Révision de la littérature concernant ce sujet, en particulier sur les symptômes, la pathogénie, le diagnostic, et le traitement.

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Chondromyxoid Fibroma of Rib*

Report of an Unusual Benign Primary Tumor

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Metastatic tumors in ribs are fairly common and if the primary neoplasm is recognized the diagnosis of metastasis is usually not difficult and can be confirmed by aspiration biopsy. Primary tumors in ribs, on the other hand, are much less common and frequently no definite diagnosis can be made until the neoplasm is resected and submitted to a competent pathologist.

In reviewing the available literature one is impressed with the relative scarcity of reported primary tumors in ribs. Over a period of 20 years Janes⁵ of Toronto encountered only eight primary tumors in ribs. There are two reports in the recent literature which bring the material on primary tumors in ribs to date: in 1942 Sommer and Major¹² collected 66 cases of proved primary neoplasms in ribs reported since 1933 and added 15 of their own from the University of Michigan Hospital; and in 1948 Dorner and Marcy³ collected 47 cases of proved primary tumors and tumor-like lesions in ribs reported since 1942 and added eight of their own which they encountered over a 12-year period at the University of Iowa Hospital. As indicated in the table, less than half of the lesions in the group of 55 cases reported by Dorner and Marcy were true neoplasms; the remaining lesions were classified as fibrous dysplasia, a term introduced by Lichtenstein^{6,10} to describe a perfectly benign lesion of the bone which is not a neoplasm but which results from perverted activity of the specific bone-forming mesenchyme. The 24 primary tumors of the rib comprising the group of Dorner and Marcy were represented by the following: chondrosarcoma eight, osteochondroma four, fibrosarcoma, chondroma and hemangioma two of each, osteosarcoma, lymphocytoma, osteoid osteoma, plasmocytoma, osteochondrosarcoma and osteochondromyxosarcoma one each. A case of osteochondroma of the first rib producing Horner's syndrome was reported in 1948.¹¹ The total number of proved primary tumors in ribs reported since 1933 is only 106.

Where no diagnosis is available and primary rib tumor is suspected surgical exploration is preferable to watchful waiting so as not to overlook a frankly malignant tumor or one in the pre-

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Series collected by Dorner and Marcy³

		Fibrous dysplasia ^{6,10} (21 army personnel)	Primary tumors of rib (34 civilians)	
Sex	Male	30	14	
	Female	1	10	
Age		19-37	11-65	
Ribs		Mostly lower	Mostly lower	
Initial symptoms- swelling &/or tenderness		About ½ of cases	All cases	
Duration of symptoms		2 mos. to 8 yrs.	6 mos. to 50 yrs.	
History of trauma		About 1/3 of cases	?	
Treatment		Resection in all	Resection in all but 3	
Postoperative follow-up		Up to 3 yrs.	1 mo. to 12 yrs.	
Results	No recurrence	No recurrence	13 (2 mos. 12 yrs.)	
		Died	6 (1-21 mos., all sarcomas)	
		Unknown	5	
X-ray diagnosis		None correct	?	
Pathological diagnosis		Correct in 1/3	?	

malignant stage; malignant degeneration of chondroma and osteochondroma is regarded as frequent enough to justify early and definitive therapy.^{2,3} Definitive therapy of primary tumors of the ribs is no longer a controversial matter; irradiation therapy is of no real value; early and wide excision is the treatment of choice; by this is meant removal of the tumor including periosteum, underlying parietal pleura and adjacent intercostal structures. The patient whose case report is to follow was handled by such an excision.

Case Report: A. L., a 39 year old white male, was first seen on December 12, 1948 because of vague pains in the region of the left lower chest posterolaterally and because x-ray inspection disclosed an abnormal shadow. The onset of the pain which was mild and never disabling was in October 1941 while he was employed as a laborer in a steel plant. In January 1942 he had an x-ray examination and urinalysis by the plant physician and was told to sleep on a hard bed. From 1943 to 1945 he served in the Army; he continued to complain intermittently and was treated with diathermy; his chest was x-rayed on induction and on discharge but no comment was made. On August 18, 1947 a 4 x 5 inch miniature chest roentgenogram was made by one of the health agencies in the course of a survey and on March 25, 1948 this examination was repeated by another agency in connection with the patient's application for a civil service position. Both were interpreted as "normal chest." These miniature films made seven months apart are the only ones obtainable, Figure 1, and reveal the same lesion which obviously was overlooked because of partial overlapping by the heart shadow.

When seen on December 12, 1948 the patient stated that there was no

change in the character of the intermittent pain since its onset seven years ago and he appeared to be free of any abnormal physical finding. At this time a posteroanterior chest roentgenogram, Figure 2, showed a fracture of the right ninth rib posteriorly and a dense shadow three inches in diameter at the level of the left ninth rib and overlapping the left heart border identical with that seen in the earlier roentgenograms. In the left lateral projection, Figure 3, the dense shadow was seen at the posterior chest wall and a roentgenogram of the spine and ribs, Figure 4, revealed a lesion involving the rib itself.



FIGURE 1

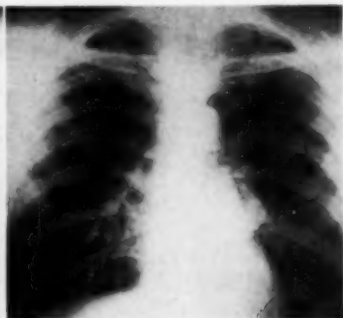


FIGURE 2

Figure 1: The roughly spherical tumor involving the posterior portion of the left 9th rib projects from behind the left heart border.—*Figure 2:* Fracture of right 9th rib along posterior axillary line. Appearance of tumor in left 9th rib is unchanged.



FIGURE 3

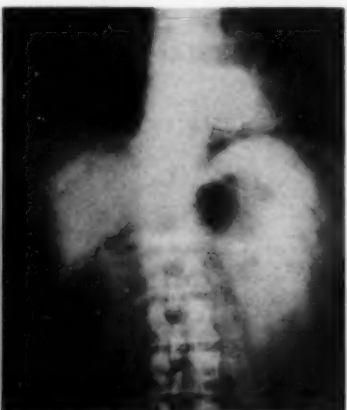


FIGURE 4

Figure 3: Spherical tumor situated posteriorly.—*Figure 4:* Overexposed film showing the callus in the right 9th rib and the tumor in the left 9th rib.

The preoperative diagnosis was primary neoplasm of the left ninth rib, nature unknown, and traumatic fracture of the right ninth rib. The fracture was at first suspected of being a pathological one, but because the miniature roentgenograms of 1947 and 1948 did not show any abnormality in the right ninth rib and because further questioning elicited a history of recent wrestling following which the right hemithorax had to be taped, the idea of pathological fracture was abandoned. The radiologist's diagnosis was fracture of the right ninth rib and giant cell tumor of the left ninth rib.

Because the true nature of the tumor was uncertain it was decided to remove it. On January 10, 1949 exploration under intratracheal anesthesia was performed. The tumor was found to project anteriorly and to involve the left ninth rib from the angle to the tip of its head. Short sections of the rib above and below were resected subperiosteally to get adequate exposure and the neoplasm was removed together with about an inch of uninvolved rib and the underlying periosteum and pleura and adjacent intercostal structures. Considerable bleeding was encountered in detaching the tumor from the body of the vertebra against which it was plastered. The wound was closed without a drain.

The postoperative course was smooth; a chest roentgenogram on the sixth postoperative day revealed an opacity over the operative field which gradually cleared up following a single aspiration of 720 c.c. of serosanguinous fluid which was sterile on culture and which did not recur. The most recent roentgenograms October 18, 1949 of the chest, spine and ribs revealed no evidence of recurrence of the neoplasm, Figures 5, 6 and 7, and the patient remains asymptomatic.[†]

The pathologist's report * was as follows: the specimen, Figure 8, consists of a fairly well circumscribed partly lobulated tumor mass measuring 6.5 cm. in maximum diameter. The external surface is smooth except for some adherent fatty tissue. The tumor is cystic. The wall is very thin and bony, having in places an egg shell appearance. The central cystic space contains bloody fluid, some of which is coagulated. Within the cystic space there are also fragments of pale reddish-gray tissue, some of which are adherent to the lining aspect. The lining is rough and partly trabeculated. The cut surface of the rib suggests that the lesion is expanded from the central medullary portion and the wall of the cyst actually is the expanded cortex. Close to the large cystic lesion within the central portion of the rib there are several small cystic spaces also filled with bloody fluid.

Microscopic examination of multiple sections, Figures 9 and 10, of the cystic tumor mass submitted for study shows in each of the sections an essentially similar histologic picture. The tumor is composed mainly of poorly developed cartilaginous tissue which in places is degenerated in appearance. The cartilaginous matrix is quite variable. Some of it is acidophilic. There are also irregular

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†When last seen in April 1951, physical condition and x-ray findings remained unchanged.



FIGURE 5

FIGURE 6

FIGURE 7

Figures 5, 6 and 7: No evidence of recurrence of the neoplasm, and the patient remains asymptomatic.

blotches of basophilic mucinous change in the matrix. The nuclei are uniform in size, predominantly small, spindle-shaped, stellate and ovoid. They show no appreciable degree of pleomorphism. Included in the sections are some of the cystic spaces noted grossly. These are lined in part with fatty tissue containing numerous macrophages laden with hemosiderin. The section taken from the periphery of the lesion required decalcification. In this one there are trabeculae of fairly well preserved bone. Here the cystic spaces are lined with a layer of degenerated blood and the walls of the cystic spaces consist mainly of dense fibrous partly hyalinized connective tissue.

The pathologist's diagnosis: * chondromyxoid fibroma of rib.

Discussion

Jaffe and Lichtenstein^{4,7,8} who coined this term point out that this benign tumor represents a peculiarly differentiated connective tissue neoplasm exhibiting certain chondroid and also myxoid traits which make it likely to be mistaken especially for chondrosarcoma. This lesion has been reported in the literature only twice before: in 1948 Jaffe and Lichtenstein^{4,8} reported a series of eight cases encountered over a period of seven years at the New York Hospital for Joint Diseases and Stratford¹³ of North Carolina in the same

*Confirmed by the American Registry of Pathology of the Armed Forces Institute of Pathology.



FIGURE 8



FIGURE 9

Figure 9: Section through entire neoplasm; low power. — Figure 10: Photomicrograph of a section of the tumor showing the chondroid and myxoid tendencies.



FIGURE 10

year reported a single case. All of these tumors were in some bone of a lower extremity and no recurrences were observed following curettage over as long a period as seven years. According to Lichtenstein⁹ the case described in this paper is the first chondromyxoid fibroma of the rib to be recognized as such. Despite the fact that the earliest chest roentgenogram available antedates the resection only by 17 months, it seems probable that the tumor dates back to the onset of symptoms seven years prior to the resection.

SUMMARY

A case of chondromyxoid fibroma of the rib is presented and discussed.

RESUMEN

Se presenta y discute un caso de fibroma condromixoide de la costilla.

RESUME

Les auteurs rapportent un cas d'effibrom echondromyxoide de la côte et font un court exposé de la question.

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Acute Generalized Hematogenous Tuberculosis (Miliary) Followed by Tuberculous Meningitis

Report of Case Treated by Prolonged Dihydrostreptomycin Therapy and Bedrest with Survival*

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There exists a marked difference in the survival rates of patients with miliary tuberculosis, meningeal tuberculosis, and miliary tuberculosis associated with tuberculous meningitis. The prognosis continues to be dire in the latter two types, and the survival rate in the miliary type accompanied or followed by meningitis is reported to be zero.^{1,2} The efficacy of prolonged dihydrostreptomycin therapy in the treatment of a young adult male with proved acute generalized hematogenous tuberculosis followed by tuberculosis meningitis, who is clinically well without apparent residual 26 months after onset, has prompted this report.

Tompsett and McDermott² in reporting on streptomycin treatment of 24 patients with miliary and meningeal tuberculosis, noted that while seven of the 10 patients with only the miliary type survived and two of five with only meningitis survived, the combined miliary-meningeal type was fatal in all 10 patients in whom the combination infection existed. Bunn³ has recently reported a two year followup of results of streptomycin therapy in 100 consecutive cases of miliary and meningeal tuberculosis. Of 19 cases having only miliary type, eight (42 per cent) are dead, and of 43 cases with only meningitis, 25 (80 per cent) are dead. There were 25 cases of miliary and meningitis combined of whom 23 (92 per cent) are dead; in addition, one of the two survivors is moribund. It is noteworthy that of 13 patients who had miliary infection followed by meningitis that 100 per cent are dead. Lincoln and Kirmse⁴ have reported a group of 92 children with primary tuberculosis who developed tuberculous meningitis while under observation; of these 77 per cent died of meningitis in less than one year. There were 16 survivors of 21 consecutive cases treated with streptomycin and promizole since 1946. Five of the cases in children reported by Lincoln and Kirmse⁴ had miliary tuberculosis with meningeal

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infection; of these one is dead, one has spastic paralysis but is otherwise well after 18 months, one had spinal fusion but is otherwise well after 27 months, one is in good condition 13 months after onset, and one infant has been under treatment for three months. Tackett and Lovejoy⁸ have recently reported a case of tuberculous meningitis surviving 27 months but ultimately dying of complications and reactivation of his infection. These authors emphasize the low 5 to 10 per cent ultimate survival rate following streptomycin therapy. The occurrence of incapacitating neurologic residual is well known.

Thus, the following is the first report of prolonged survival in an adult who has had miliary tuberculosis followed by tuberculous meningitis. Further, no previous case has received streptomycin therapy over such a long period (15 months).

Case Report. I. F., a 29-year-old white pharmacist was admitted to the Evans Memorial Hospital by transfer from another hospital on November 19, 1948, with a diagnosis of miliary tuberculosis and associated tuberculous meningitis.

Chart I summarizes the temperature changes, cerebrospinal fluid findings and treatment schedule over the entire course of the patient's illness.

Summary of Previous Hospital Admission. September 23, 1948 to November 19, 1948 Chief complaint was fever and headache of six weeks' duration.

Family History. A sister, with whom the patient had been in close contact, had had pulmonary tuberculosis treated with thoracoplasty 10 years prior to his admission.

Present Illness. Six weeks prior to admission the patient developed

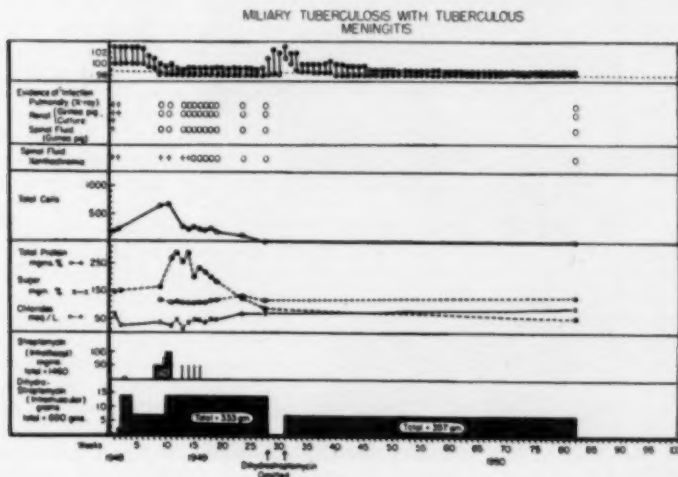


Chart I: Clinical Course.

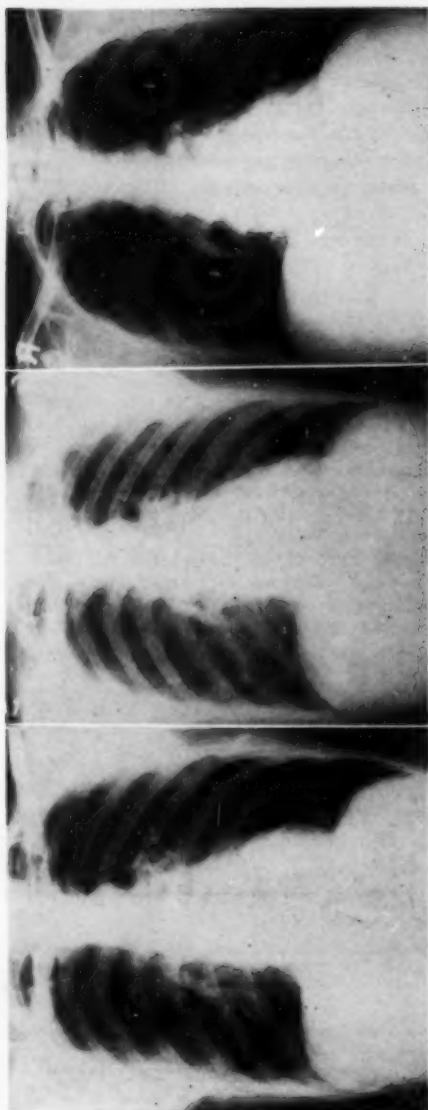


FIGURE 1a

FIGURE 1b

FIGURE 1c

FIGURE 1: Chest Roentgenograms.

(A) August 10, 1948—Diffuse hazy increase in lung markings.

(B) September 24, 1948—Diffuse millary tuberculous.

(C) April 26, 1950—No evidence of active tuberculous process.

supraorbital headache, malaise and afternoon temperature elevation to 101 and 102° F. This was treated with bedrest, penicillin, and sulfadiazine with remission of symptoms within one to two weeks. After seven to ten days of remission, there was a recurrence of all the previous symptoms, and treatment with intravenous penicillin and sulfadiazine gave no further relief. On the day prior to admission the patient became nauseated and vomited. The only associated symptom was mild anorexia. There had been no cough, chest pain, hemoptysis, dysuria, hematuria, or frequency of urination. No change in bowel habits had been noted.

X-ray examination by a private physician six weeks prior to admission revealed diffuse hazy increase in lung markings extending outward from both hilar areas (Figure 1 (A)).

Physical Examination. Temperature 101.8 degree. Pulse 80. Blood pressure and respirations were normal. Positive findings: Fundoscopic examination showed blurring of the nasal disc margins bilaterally. Neck: There was slight resistance to extreme antiflexion. Lungs: Slight dullness to percussion over the upper lobes posteriorly and bilaterally with fine crackling rales over the right upper posterior chest. Heart: Within normal limits. Abdomen: There was slight to moderate tenderness in the left flank.

Laboratory Data. Urine showed 1+ albumin and 4+ acetone. Hemoglobin 14.8 grams per cent. White blood count 11,000 with 87 per cent polymorphonuclear leucocytes and 6 per cent monocytes. No reaction to tuberculin in dilutions of 1:100,000 and 1:10,000; but reacted to 1:1,000.

X-ray studies on September 24, 1948 (Figure 1B showed generalized irregular increase of lung markings with millary areas of consolidation over both lung fields, including the apices. There was evidence of calcification in the right lower lung field. Approximately two weeks later the chest showed fine nodular streaky consolidation in both lung fields, and a film three weeks later revealed marked improvement in the lung markings. On November 9, 1948, retrograde pyelogram showed the calyces, pelves and ureter to be moderately outlined with no definite evidence of gross pathology. Skull film was normal. Electrocardiogram was normal. Electroencephalogram showed abnormal high voltage with slow waves throughout all areas. Periods of high voltage with slow episode from right hemisphere with relative suppression of amplitude over the left hemisphere. Conclusion: Diffusely abnormal electroencephalogram. There were marked changes during over-breathing with numerous episodes of high amplitude and slow activity. Asymmetry at rest, during over-breathing, suggested lateralization to the left hemisphere. More dysrhythmia noted in the left anterior area during over-breathing.

Clinical Course. The patient was placed on bedrest, penicillin 100,000 units every six hours, and supplementary vitamins. During the first week of hospitalization, temperature fluctuated between 100 and 103 degrees F. rectally; pulse varied from 80 to 110. Temperature remained elevated and the patient was started on streptomycin in a dosage of 500 mgm. a day intramuscularly and orally. The dosage was changed after four days, and streptomycin started in a dosage of 0.5 grams four times daily intramuscularly. On the 13th hospital day the temperature fell to normal levels and over the next four weeks ran an irregular course with days of normal temperature alternating with spikes of 100 and 102 degrees rectally. After two weeks of streptomycin therapy, the caloric test did not elicit nystagmus. Repeated lumbar punctures were done

(Chart I). Headache was rather prominent but was fairly well controlled with codeine sulfate. Numerous urinalyses revealed 3 to 10 white blood cells and 0 to 4 red blood cells per high power fields. White count ranged from 7 to 11,000 with a normal differential. On the 24th hospital day, 10 mgm. of streptomycin were given intrathecally and parenteral streptomycin dose was decreased to 0.5 grams b.i.d. On the fifth week of hospitalization urine cultures taken during the first week of hospital stay were reportedly growing acid fast bacilli, but subsequent examinations were negative (Chart I). Repeated neurologic examinations were negative up to the second week of hospitalization, at which time the only abnormality noted was dorsiflexion of the right great toe on Oppenheim reflex. This finding persisted throughout the remainder of his hospital stay, and repeated caloric test failed to induce nystagmus. Temperature gradually fell to normal levels with occasional spikes to 100 degrees orally. On the 54th hospital day, the schedule of streptomycin therapy was altered to 50 mgm. intrathecally three times weekly, and 1 gram of streptomycin daily intramuscularly. The patient was markedly improved symptomatically, and there were, at the time of discharge, periods of complete freedom from headaches. Blood pressure ranged from 90/40 to a single high determination of 122/84.

Interval Note. The patient was transferred from another hospital to private facilities at the Evans Memorial Hospital for continuation of therapy. He continued to complain of weakness, and supraorbital headaches which had tended to become one-sided, had also persisted.

Physical Examination, on November 19, 1948 revealed temperature of 99.4 degrees, pulse 100, respirations 18, and blood pressure 110/55. He was a well developed, but thin and wasted young male, appearing pale and chronically ill. Eyes: Pupils were uniform and equal; reacted to light and to accommodation. Fundoscopic examination was negative. Neck: Supple. Chest: Resonance was greater at the bases than at the apices, bilaterally. No rales were heard. Normal breath sounds. Fremitus was uniform. Heart: Not remarkable. Abdomen: No masses nor tenderness. Neurological examination was within normal limits.

Laboratory Data. Hinton negative. Urine: Concentrated on random specimens to 1.017; showed a 0 to s.p.t. of albumin; no sugar, ketones or bile. There were 1-4 w.b.c and 0-10 r.b.c. per h.p.f. This microscopic hematuria disappeared completely later in the hospital course. Culture and guinea pig inoculation for tuberculosis were negative. Blood: Sedimentation rate ranged from 10-7 mm. per hour. Hemoglobin 13.2 to 14.6 grams per cent. White count varied from 14,200 to 8,200 with normal differentials.

Clinical Course. During the first three weeks of hospitalization he had several spikes in temperature, of mild degree, the highest being 103.2 degrees F. on the second hospital day. Thereafter he was essentially afebrile with a rare spike in temperature to about 99 degrees F. He was started on streptomycin 0.5 gram four times daily intramuscularly, and on the sixth hospital day daily lumbar punctures were performed with the instillation of first 15, then 75, and finally 100 mgm. of streptomycin with each of these punctures. He continued to complain of weakness and severe frontal headaches which were little relieved by oral codeine sulfate.

Neurological examination showed no localizing signs.

Starting on the 11th hospital day he would vomit most of his meals

and shortly thereafter he began to complain of severe leg pains, especially on the left near the sciatic distribution. On one occasion intravenous fluids was necessary because of persistent vomiting. It was thought that the leg pains were due to arachnoiditis.

On the 18th hospital day there was some increase in the stiffness of the neck and a positive Kernig sign. The knee jerk and ankle jerk on the right were questionably increased. Dr. Chester S. Keefer saw the patient in consultation and suggested that the intrathecal administrations be changed to one injection weekly, and the intramuscular ones be reduced to 0.5 gram twice daily. Within three days after the change of the streptomycin dosage schedule, the leg pains had markedly decreased. The stiff neck also subsided but over a longer period. Streptomycin therapy schedule was continued throughout the hospital course. By the 26th hospital day he began to complain of rather severe localization of frontal headache in the region of his left eye. Examination of the eye was negative. His other main complaint during subsequent period was occasional hot and cold sensations accompanied by shiverings and preceded by an olfactory aura. During several of these attacks he was noted to shiver and sweat profusely but no localizing neurological signs were found. Gradually, over the course of the next six weeks, the headaches decreased and the left eye pain also lessened. At one time there seemed to be slight ptosis on the right, but this too gradually passed. Relief was obtained, for the most part, with ice bags and codeine sulfate. On at least two occasions during his hospital course unsustained nystagmus on right lateral gaze was observed. No other significant neurological change developed, and he gradually began to look and feel better, with a decrease in headaches. During his hospital course he gained a total of about seven pounds in weight. By the 72nd hospital day it was felt that he had shown sustained improvement. He was afebrile. Sedimentation rate shortly before 72nd hospital day had been within normal limits. Cerebrospinal fluid changes are shown in Chart I. Neurological examination showed nystagmus of the right eye on right lateral gaze with slight ptosis of the left lid. There was also a questionable Hoffman bilaterally. Neurological examination at this time was otherwise not remarkable. Ocular and vestibular functions were intact. Because of these findings it was felt that he was sufficiently well to return home and be followed by his private physician and return to the hospital for monthly lumbar punctures.

During his hospital course he had received a dosage totaling approximately 135 grams of dihydrostreptomycin intramuscularly and about 1.5 grams intrathecally.

At the time of discharge, on the 72nd hospital day, his condition was considerably improved and he did not require analgesics for relief of headaches.

He was readmitted to the Evans Memorial Hospital on April 26, 1949, with chief complaint of fever of four days, duration.

Interval Note. He remained well following discharge from the hospital but he received 1 gram of streptomycin daily until April 6, 1949, then it was omitted for the three weeks prior to admission. Temperature averaged 99.2 degrees orally.

In April he noted that hearing in the left ear was diminished, and he experienced sudden onset of constant tinnitus in the left ear. Three days prior to readmission he felt flushed. Temperature was 99.6 degrees orally.

Elevation in temperature persisted, reaching a high of 101.6 degrees one day prior to admission.

He had had occasional dull left retro-bulbar pain, and frequent generalized heavy headaches, which were steady in nature and precipitated by movements of the head since discharge. He had had no chills, cough, hemoptysis, visual disturbances, genitourinary or gastrointestinal symptoms.

Physical Examination. Temperature 100 degrees. Pulse 100. Eyes: Right corneal opacity. Fundi - Nasal margin of the right disc was questionably blurred. Lungs: Apices were dull posteriorly, more marked on the right. Neurological Examination: Positive Oppenheimer sign, right. Slight ptosis of left eyelid. Hearing in the left ear was markedly decreased.

Laboratory Data. Hinton negative. Urine: pH 4.5 to 7.5. Specific gravity 1.001 to 1.014. Albumin negative to 1+. 0-15 w. b. c. 0-20 r.b.c. Occasional hyaline casts. On admission corrected sedimentation rate 10. Hemoglobin 17.2 grams, white blood count 10,800 with 82 per cent polymorphnuclear lincocytes, 10 per cent lymphocytes, 6 per cent monocytes, 1 per cent eosinophils and 1 per cent metamyelocytes. Throughout the remainder of his hospital stay white count averaged 9,000 with a normal differential. On discharge, corrected sedimentation rate was 7 mm. per hour, hemoglobin 15.5 grams, white blood count 8,200 with normal differential. See Chart I for results of spinal fluid examinations. X-rays on April 26, 1949, minimal degree of pleural thickening along the right chest wall laterally.

Clinical Course. During the first six hospital days the patient ran a sustained temperature elevation between 102 and 103 degrees, with pulse averaging 110. During the next week the temperature averaged 101 degrees, pulse 92, where they both remained until the 29th hospital day. From the 29th to the 71st hospital day he had daily temperature spikes up to 100 degrees F., and pulse averaged about 100. From the 71st to the 111th hospital day, the day of discharge, temperature stayed at about 99 degrees orally, with an occasional spike up to 100 degrees, and pulse averaged 104.

On the first hospital day he had an episode of thrashing about in bed with no true tonic or clonic seizures, and no incontinence. This lasted for about five minutes. On the same day he had another episode in which he became cyanotic, frothed at the mouth, thrashed about and was unresponsive. This lasted for five or 10 minutes. It was followed by transient twitching of the right face and right back. There were no signs of meningeal irritation. He was started on Vitamin A therapy on the day of admission.

On the second hospital day he was started on streptomycin, 2 grams intramuscularly daily. From the 12th to the 68th hospital day he received streptomycin 2 grams daily intramuscularly. From then until the 79th hospital day, 1 gram daily intramuscularly. From the 79th day to the day of discharge, dihydrostreptomycin 0.5 gram intramuscularly daily.

June 22, 1949 he developed vague warm sensations starting at the toes, running up both legs and thighs, became tense and apprehensive, and was said to have had a generalized tonic-clonic seizure lasting 15 to 20 seconds. He remained confused for about 30 minutes. No neurological changes were noted following recovery from this seizure.

On the day following he had several minor episodes in which he became very nervous, chin trembled, and he felt chilly all over. This cleared with mild sedation with sodium luminal.

June 24, 1949 he had several similar episodes as on June 23, but no true seizures. Following this he had no more seizures or suggestion of them. His headaches improved markedly. On July 22, 1949 caloric tests showed a markedly delayed response and a short duration nystagmus indicating hypoactive labyrinth function bilaterally. Hearing test revealed slight diminution in hearing with small frequencies to both air and bone conduction, indicating nerve type of deafness.

He was discharged on August 14, 1949 with instructions to take streptomycin 0.5 gram daily, and supplementary vitamins including large doses of Vitamin A. He was again readmitted for evaluation on April 17, 1950 and had been asymptomatic in the eight months since discharge. Streptomycin (0.5 Gm. daily) had been given until two months prior to admission. He had been continued on almost complete bedrest since his first admission. There had been a weight gain of about 30 pounds in the previous eight months. This represented a total weight gain of 70 pounds since initial weight loss in 1947-1948. His only complaints were tinnitus, which was mild in character, and slight drooping of the right eyelid. There had been no fever, night sweats, weakness, headache, convulsions, sensory effects, cough, or visual complaints.

Physical Examination. At this time examination was essentially unchanged from previous admission, except for quite marked obesity. Hearing was slightly diminished bilaterally, but not noticeable for conversational tones. Audiograms revealed fairly good hearing in the speech range, averaging about 20 decibels loss, but there was a moderately sharp drop in the frequencies 4096 to 8192. Bone conduction was down to 50 decibels loss in the right ear in the speech range, and to 35 decibels loss in the left ear. Thus, he did show a high tone nerve deafness with adequate speech hearing. Caloric labyrinthine tests (Kobruck method) revealed a marked hypoactivity. There was no subjective vertigo in either ear after 40 cc. of ice water was inserted (normally responds to 5 cc.), and there was only a fleeting nystagmus to opposite side after two minutes. Conclusions were that since hearing was relatively good with marked hyposensitivity of the peripheral end organ of the labyrinth that severe damage had resulted to the labyrinthine vestibular nuclei and only mild to moderate damage to the peripheral cochlear end organ.

Laboratory Data. Urine was normal. Hemoglobin 17.15 Gm. per cent. White blood count 9,900 with normal differential. Corrected sedimentation rate was 8 mm./hr. Cerebrospinal fluid examination was remarkably normal (Chart I). Chest x-ray inspection was within normal limits (Figure 1C).

He was discharged home on the third hospital day on no therapy and to begin progressive ambulation, which he has continued to date.

Over the course of illness he received a total of 690 Gm. of intramuscular streptomycin and 1460 mgm. of intrathecal streptomycin.

Figure I indicates the chest x-ray film findings (A) at the onset of the patient's illness, (B) the later miliary distribution of the pulmonary process, and (C) the final chest roentgenogram showing complete clearing of the tuberculous process.

Comment

The efficacy of prolonged dihydrostreptomycin therapy and bedrest in acute generalized hematogenous tuberculosis followed by tuberculous meningitis is reported in a young adult who is clinically

well 32 months after onset of illness without serious residual. At onset of the disease, chest roentgenograms showed evidence miliary tuberculosis; urine cultures and guinea pig inoculations of cerebrospinal fluid and urine were positive for tuberculosis. Electroencephalogram was abnormal. The patient was treated with daily intramuscular injections of 2.0 to 0.5 Gm. streptomycin for 15 months and 10 to 100 mgm. dosages of intrathecal streptomycin over a period of three months (Chart I), plus 22 months of bedrest. A total of 690 Gm. of intramuscular streptomycin was given. It is noteworthy (Chart I) that pulmonary and renal evidences of tuberculosis had disappeared after eight weeks of therapy, but that evidence of meningeal involvement persisted for at least nine months. When dihydrostreptomycin therapy was discontinued during the 29th week, there was an immediate febrile course associated with convulsions indicating possible reactivation of the meningeal process. Resumption of active therapy for the next 51 weeks has apparently resulted in complete cure.

Discussion

This case probably has had the most prolonged course of streptomycin therapy on record. In a disease that previously has been reported as 100 per cent fatal, one is justified in trying an extensive therapeutic regimen. An important limiting factor in the widespread use of streptomycin or its catalytic hydrogenation product, streptomycin, has been the neurotoxic effects with loss of vestibular function as well as other toxic reactions.² Although vestibular dysfunction and slight auditory effects did occur, it was minimal from a clinical standpoint and was a small price to pay for apparent cure of a universally fatal disease. Tompsett and Walsh² have presented an excellent review of the neurotoxic and other effects of streptomycin therapy, and it is certainly not our purpose to discuss this feature of antimicrobial therapy on the basis of this single case. However, it is worth-while to note the relatively few subjective evidences of such a prolonged course of therapy. It is of further interest to note that there was apparently no emergence of drug-resistant bacteria in the course of this patient's disease, particularly emphasized by rapid clinical response to reinstitution of streptomycin therapy for apparent reactivation of the disease after the drug had been discontinued during the 28th week for a period for three weeks.

Addendum

Patient was reexamined 4 months later i.e. 30 months after the onset of his illness.

He remained quite well, with the exception of slight ringing in

both ears, which has persisted since his second course of streptomycin. Neurological examination was entirely negative with the exception of slight ptosis of the right lid. Spinal fluid on November 11, 1950 showed initial pressure of 170, final pressure 130, seven r.b.c/cu m.m. No white cells, total protein 43.8 chloride 124.2 and sugar 92. Otology consultation by Dr. Zondermann. Hypoactive labyrinth severe, nerve deafness with good residual hearing in the speech range. Lungs remained clear on x-ray examination. The patient did not appear to have any mental or other neurological impairment.

Summary

A case of acute generalized hematogenous tuberculosis followed by tuberculous meningitis, treated by prolonged dihydrostreptomycin therapy and bedrest is reported with apparent complete clinical cure after 32 months and only minimal subjective neurologic residual.

RESUMEN

Se comunica un caso de tuberculosis hematogena generalizada aguda seguida de meningitis tuberculosa, tratada con dihidroestreptomomicina y reposo en cama prologados, con una aparente curación clínica completa, después de 32 meses y con sólo un residuo neurológico mínimo.

RESUME

Les auteurs rapportent un cas de tuberculose aigue généralisée hématogène, suivie d'une méningite tuberculeuse traitée de façon prolongée par la dihydrostreptomycine et le repos intégral. La guérison clinique semble complète après 32 mois, et on ne constate que quelques minimes séquelles neurologiques subjectives.

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A Surgical Rehabilitation for the Coronary Cripple*

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In order to emphasize some of the points which will be discussed in this paper, a list of 10 questions has been prepared. Each of them relates to a certain phase of the subject, and they will be discussed and answered in turn. The questions are as follows:

1. What is a coronary cripple?
2. Are there many of these patients?
3. What is meant by rehabilitation?
4. What is the medical treatment for these patients?
5. What is the possibility of medical rehabilitation?
6. What is the possibility of surgical rehabilitation?
7. To what minimum standard should this conform?
8. Is there such a method?
9. How does it work?
10. What are the results?

Many coronary patients suffer so severely from anginal pain that their physical activities are more and more restricted and they eventually become incapacitated. Since they are incapacitated by this factor alone, they are classified as coronary cripples.

Of the four million cardinals in the United States, it is estimated that from one-half to one and one-half million of them have coronary artery disease and angina. In 1948 there were more than 160,000 deaths from coronary disease, or over 11 per cent of the total death rate of this country.

All patients having coronary disease do not die from this condition, nor do they necessarily have thrombosis, but of those who have had thrombosis and have survived the attack for one year, about 50 per cent are never able to work again. About 25 per cent can work part time and only 25 per cent full time.

These figures lead us to believe that the number of coronary patients who are crippled or incapacitated by the disease, is large enough to demand some effort towards rehabilitation.

We have arbitrarily determined that rehabilitation for these patients should mean four things: (1) a relief of anginal pain; (2) an increase in the exercise tolerance; (3) the ability to move

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around and take care of their daily needs; (4) a return to their former or some gainful occupation.

Medical treatment for this specific group of patients is insufficient and rather unsatisfactory. It consists principally in symptomatic relief. Few, if any, of these patients are ever rehabilitated to the point where they are relieved of angina or can return to their former occupations. As a group they are considered as failures. The medical regime is actually one of reverse rehabilitation in which the physical activities of the patient are more and more restricted.

It is with this same group of cripples that we have been working for the past 12 years and we believe that we have a successful method for their surgical rehabilitation.

Any surgical procedure upon a group of such poor risk patients should conform to certain minimum standards. First, it should be a simple technical procedure which could be performed easily by a competent surgeon. Second, it should require a short time for its performance and could thus be applied to a larger group of these poor risk patients. Third, it should not of itself carry any great risk or mortality. Fourth, it should give, with relative certainty, a minimum of at least 50 per cent rehabilitation to the majority of these patients.

Our method consists in changing the ischemic myocardium of coronary disease into a myocardial hyperemia. This change from hypo to hyperemia of the myocardium overcomes the mechanical effect of the disease and is accomplished by spreading sterile U.S.P. powdered talc inside the pericardial sac. Talc is a form of silica and when placed inside the pericardial sac produces a talcum granuloma (Figure 1).

Following the introduction of the powdered talc inside the pericardial sac, an acute inflammatory reaction takes place which involves all of the structures in the mediastinum—the pleura, the pericardium, the epicardium and adjacent myocardium, the esophagus and lungs. One of the characteristics of this acute reaction is the marked hyperemia of these structures which occurs within a few hours. This reaction with its hyperemia not only opens and dilates anastomosing blood vessels between the two main coronary arteries which are already present, but it also stimulates the formation of additional new blood vessels. As a result of the hyperemia more blood is carried to and is present in the myocardium, thus overcoming the myocardial ischemia. A fever accompanies this mediastinal reaction and usually lasts for five to ten days, subsiding gradually. As the acute reaction subsides, it is followed by a chronic foreign body granuloma involving the superficial surface of the myocardium and characterized by

hyperemia and increased vascularity. This chronic inflammatory reaction may last for years since the powdered talc remains indefinitely fixed within the adherent tissues of the myocardium and pericardium (Figure 2). Some talcum granulomas have been reported lasting for 20 years.

Adhesive pericarditis occurs as a result of the inflammation but constrictive pericarditis does not take place, nor do any other adverse complications occur as a result of the adhesions.

It is the general belief that in coronary artery disease, a constant attempt is made by the myocardium to produce new collateral blood vessels. Given the necessary length of time or a sufficient stimulus, the rate at which these myocardial vessels are formed may become equal to or even greater than the rate of occlusion produced by the disease process. We believe the irritation and resulting hyperemia of the talcum granuloma is the necessary stimulus to the myocardium for the production of its intercoronary vessels. Even though the hyperemia of the acute reaction subsides and some of the immediate stimulus is thereby withdrawn, the increased collateral formation once it is started, may continue for an indefinite period of time.

The selection of patients for operation depends upon: (1) The establishment of a positive diagnosis of coronary artery disease



FIGURE 1: A microphotograph of a section taken from the heart of one of our patients who had been operated upon for coronary artery disease approximately two years previously. At the top of the illustration the pericardium can be seen. The center is occupied by granulation tissue. The myocardium can be seen in the lower part.

with angina. This may depend upon subjective findings such as a characteristic anginal syndrome related to effort, or it may depend upon objective evidence as revealed by electrocardiogram, although this is occasionally absent. (2) The lack of improvement after prolonged medical treatment. (3) An extreme degree of disability.

A previous infarction is not a contraindication. The two principal contraindications to operation are congestive failure and an active infarction.

The operation is simple and easy to perform and it conforms to the minimum standards which were previously mentioned. An incision is made over the fifth costal cartilage on the left side and about two inches of this cartilage is removed. This site is over

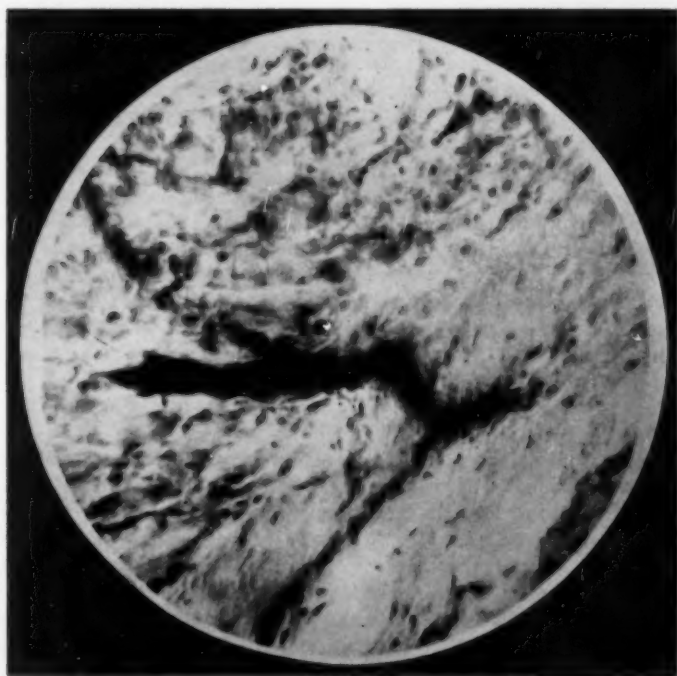


FIGURE 2: A microphotograph (high power) of a section taken from the heart of one of our experimental animals. The animal had been operated upon six months previously when powdered talc was placed inside the pericardial sac. At the time this section was made, the animal had been sacrificed and one of the pericardial vessels was injected with india ink. Notice one large blood vessel crossing the line of adhesions between pericardium and myocardium. Above this vessel and to the left, numerous talc granules are visible.

the so-called free space and the pericardium is opened without entering the pleura. Five to 10 minutes before the pericardium is opened, the patient receives 5 cc. of 2 per cent novocain intravenously to desensitize the myocardium. After opening the pericardium, the fluid is aspirated with a soft rubber catheter and the anterior surface of the heart is inspected and palpated for previous infarcts, adhesions and the condition of the descending branch of the left coronary artery. Approximately 2 drams (by volume) of dry sterile talc powder is spread over the anterior surface, the right and left and inferior borders of the heart. The powder is spread as evenly as possible so that the myocardium is white, but the powder is not caked in one spot. The chest wall wound edges are protected from the powder by covering them with moist gauze. The pericardium is now loosely and incompletely closed with fine catgut and the soft tissues are closed in anatomical layers.

We classify our results into poor, moderate improvement, and marked improvement. Poor means less than 33 per cent improvement. Moderate means from 33 to 66 per cent and marked means more than 66 per cent improvement or rehabilitation.

We have operated upon 42 patients. Six of these died following the operation before leaving the hospital, giving an operative and hospital mortality of 13 per cent. An additional six have died from one and one-half to six years after operation and one has been lost from our follow-up. Of the 29 remaining, four or 14 per cent are classed as having poor results. Eighty-six per cent of the patients are more than 50 per cent improved and 70 per cent are more than 66 per cent improved. Eight patients or 27 per cent claim they are completely well and normal.

SUMMARY

I would like to emphasize that we have operated upon a specific group of patients who were medical failures. We do not intimate that this form of treatment is a cure for coronary artery disease. It is a method of rehabilitation for a definite group of patients. In view of the disability of these patients, the fact that they were poor surgical risks and already classed as failures from the standpoint of treatment, we believe that there is a definite possibility of surgical rehabilitation for the coronary cripple and that this method which we have described is very satisfactory.

RESUMEN

En conclusión queremos recalcar que hemos operado en casos en que el tratamiento médico ha fracasado.

No tratamos de asegurar que esta forma de tratamiento cura

la enfermedad coronaria. Es un método de rehabilitación para cierto grupo de enfermos.

En vista de que están inválidos, son muy malos riesgos quirúrgicos y ya están clasificados como fracasos del tratamiento, creemos que hay un positivo recurso quirúrgico de rehabilitación y que el método que describimos es muy satisfactorio.

RESUME

Cette intervention a été faite dans un groupe de malades où le traitement médical avait échoué. Nous n'affirmons pas qu'il s'agit là d'un véritable traitement définitif de la maladie. C'est une simple méthode qui permet de rendre à la vie active un groupe particulier de malades. La méthode décrite a l'avantage de ne comporter pratiquement aucun risque opératoire.

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What Should Occupational Therapy Be in a Tuberculosis Setting

IRENE GRANT, O.T.R.*
Milwaukee, Wisconsin

Tuberculosis control aims to keep the active case under surveillance, preferably in a sanatorium where rest can be promoted and the dramatic benefits of surgery and modern drugs are available.

Along with physical rehabilitation we have, today, correlating services in the sanatorium which are a necessary adjunct in the plan of restoring the individual to the fullest scope possible of his interests and ability.

Tuberculosis is a disease in which it is most essential to treat the patient as a whole, for the mind plays a dominant, if not a major role. To revamp the mental attitude produced by the emotional shock of illness, long hospitalization and its attending uncertainties, we strive to rebuild man's ego by progressive steps. In the broad pattern, occupational therapy has advanced from the simple craft idea to one of varied therapeutic activities supported by the inflexible precept of medical prescription. Such services as education, music therapy, biblio-therapy and recreation should be included in the patient's graded and supervised exercise. Conversation is a valuable spoke in the wheel of therapeutic progress as it kindles a spark of interest most unexpectedly.

The occupational therapist is trained in schools and colleges approved by the American Medical Association. The four-year course is followed by a nine-month internship in orthopedic, general medicine and surgery, psychiatry, pediatric and tuberculosis services. The therapist should have a cheerful, out-going personality, a sincere interest in people and a desire for service. Her academic interests should include science and art; a certain amount of manual dexterity is important. Thus equipped, the registered occupational therapist can accept her place on the rehabilitation team. She can assume her part in adjusting the patient to long hospitalization, provide him with an objective interest leading to contentment, provide the amount of physical activity indicated by his physician and help train the patient to keep within his capacity. The patient's need of a reasonably satisfying background of developing interests scaled to his tolerance to relieve the tension of anxiety, apprehension and the

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required inactivity of curetaking is a problem for all concerned, but specifically for the occupational therapist.

Occupational therapy differs from most other prescriptions in that it is given in increased dosage as the patient improves. Most sanatoriums have a graded exercise schedule. This classification varies, but covers these points:

Class I: Surgical and acutely ill patients who are allowed no physical activity, but for whom reading, pictures, guessing games, and radio, provide mental rest and an objective interest.

Class II: The bed-patient who is allowed slight activity and can be given light handwork, reading, inactive games and puzzles.

Class III: The patient who is allowed to be up part-time is given increased activity such as more detailed handwork, educational work and group-socializing parties. Testing is begun by the rehabilitation counselor to determine aptitudes.

Class IV: The patient is allowed to go to the central workshop for a strengthening program to build up his tolerance preparatory to his discharge. Pre-vocational and vocational plans are made.

Patients should be advised to consider assignments of exercise as a medical prescription which will aid as much in ultimate recovery as any drug or other medical measure.

Throughout his cure-taking, the occupational therapist supplies the patient with suitable and varied projects that initiate new technical skills and develop his latent talents. While the crafts offer him immediate interest and stimulation, the therapist gleans considerable information about his general field of interests, his special abilities whether mechanical, creative, intellectual, or commercial, plus his ability to do exacting work (or its opposite). This information is available to the rehabilitation counselor for overall planning.

Education can be as therapeutic as occupation. Courses of study can be taken for their cultural interest, or for high school credit. Most of the educational work will consist of bedside tutoring of such subjects as the languages, literature, speech, history, shorthand, art, science, and typing for the ambulatory patients who can come to the school room.

If the sanatorium has a public address system, it is possible to present a "School of the Air" series of review courses in English, practical mathematics, spelling, history, and subjects pertaining to civic interests in the community. Mimeographed lesson sheets enable the student-patients to follow the lesson the teacher gives via the microphone. A follow-up after the broadcast is possible when needed. The educational work often follows an awakening of interests evaluated in the testing program.

Bibliotherapy presents a library service that gives first con-

sideration to therapeutic objectives. Reading provides entertainment and interest and for the newly admitted patient it is a familiar pastime which does not tax his energies, but one which induces physical and emotional relaxation. Guided reading programs can offer a substitute for types of recreation that would be harmful. Ambulatory patients can be helpful in a library service, and it is an encouraging experience for them to reciprocate in a service they enjoyed when they were confined to bed. Reading widens the horizons and enriches one's background; it also offers practical information that may be of help in later adjustments. An adjunct to this service is a mobile 16 mm. movie unit which brings films of travel, literature, art and science to the bedside.

The public address system offers additional opportunities for patient participation. Musical programs can be written and announced, dramatic skits can be broadcast and if there is a patient's-activity committee, the proceedings of their meetings can be brought to the entire group.

Music-appreciation broadcasts stimulate and encourage better listening enjoyment, just as good reading habits provide a satisfying recreation while curing and during the first months at home after discharge.

New habits of recreation must be patterned and while the ambulatory patient can enjoy group parties, weekly movies, summer picnics, croquet, and flower and vegetable gardening on a small scale, the bed patient must be more passive. In addition to music and reading, he has chess games, stamp collecting, ward movies, quiet games and the aforementioned therapeutic occupations.

All of the activities provided aim to promote voluntary stay in the sanatorium until medically discharged, as well as to preserve the patient's incentive and interest in normal procedures equal to his physical capacity.

During the curing term, the rehabilitation counselor gathers a composite of information from the therapists about the patient's interests, his skills and attitudes as related to his previous work experience and his adjustment in relation to his physical tolerance program in the sanatorium. This affords the counselor an opportunity for trial and verification of the patient's abilities and aptitudes as revealed by testing and other sources. These will have definite vocational significance in considering the demands of the job or training plan of the individual. Because occupational therapy, both in its diversional and its practical application, is largely based on performance, it provides a valuable and practical source of functional aid and information to the rehabilitation department.

The social service member of the rehabilitation team offers the

patient emotional stability by considering the factors that might be disturbing elements in his adjustment. Ease of mind is essential to relaxation and many are the problems that face one confronted with long hospitalization.

The future of the patient is the concern of all who work with him. The physician, the nurse, the social worker, the rehabilitation counselor, the occupational therapist and the educational therapist—all are concerned with the restoration of individuals to usual tasks and usual activities. They are concerned with the individual's physical, mental and emotional background, his ambitions and his goals. Each worker has separate techniques. Occupational therapists, for the most part, have a wider knowledge of crafts and leisure-time employment. Rehabilitation workers know about jobs and training for jobs which the community has to offer when the patient again becomes a wage-earner. Social service is able to counsel and serve both the patient and his family in necessary adjustments. The physician and the nurse care for the medical and surgical treatment of the tuberculous patient. The team works for the restoration of the individual to the fullest scope of his interest and ability and his good health.

*"Absence of occupation is not rest
A mind quite vacant is a mind distressed."*
—Cooper.

Committee on Rehabilitation

Members of the Committee on Rehabilitation, a subcommittee of the Council of Tuberculosis Hospitals, have felt the need for a more accurate spelling out of the functions of the "Rehabilitation Team."

It has occurred to us that in many instances the actual functions of each participant in the team were not always clearly understood by the medical profession, the very captain of the team.

Over the next few months articles will be submitted by occupational therapist, social worker, vocational counsellor, nurse, volunteer worker, etc., defining in broad terms the functions of each group and the part each individual discipline plays in the total framework of rehabilitation. After such articles have been published it is planned to present one over-all written paper by your committee, drawing all of these threads together and presenting the official College attitude towards rehabilitation of the tuberculous and the framework of such planning within sanatoria.

There is published in this issue an article by Irene Grant of Muirdale Sanatorium, long known for its occupational therapy program. Miss Grant has avoided deliberately certain controversial issues, such as the table of organization of the rehabilitation team, as well as the actual number of occupational therapists necessary in any one setting. Her own belief is that one therapist can usually cover about 50 patients, while the Committee on Standards recently recommended one therapist for 100 patients.

It is our feeling that Miss Grant's paper is a fair representation of the part that occupational therapy plays in the total program of rehabilitation of the tuberculous.

Allan Hurst, M.D., F.C.C.P., Chairman,

Dr. Chevalier L. Jackson Takes Office as College President

Chevalier L. Jackson was born August 19th, 1900, near Pittsburgh, Pennsylvania. He graduated from the College Department of the University of Pennsylvania with the degree of AB in 1922, and from the Medical School of the same University with the degree of Doctor of Medicine, in 1926. After a year of internship he entered the Graduate School of Medicine of the University of Pennsylvania for the study of otolaryngology, and, subsequently he received the degree of Master of Science in Medicine. He was made Clinical Professor of Bronchoesophagology at Temple University shortly after completing his postgraduate studies, and held that post until 1938 when he became Professor of Bronchoscopy and Esophagoscopy. In 1946 the name of the Chair was changed to Professor of Laryngology and Broncho-Esophagology. Dr. Jackson is bronchoscopist at the Chestnut Hill Hospital, the Eagleville Sanatorium, the Lankenau Hospital, and the Mary J. Drexel Home. He is Consulting Bronchoscopist at the Philadelphia Hospital for Contagious Diseases, the Montgomery Hospital at Norristown, Pennsylvania, and the Delaware Hospital at Wilmington, Delaware.

In addition to the postgraduate courses given at the Chevalier Jackson Clinic in Philadelphia, Dr. C. L. Jackson has given postgraduate courses in Paris in 1937, 1938, 1939 and again in 1949, 1950 and 1951. Similar courses were given in Mexico City in 1942 and 1949, in Madrid in 1947, and in Montevideo and Buenos Aires in 1948. Dr. Jackson is a member of the Advisory Board of the American Hospital of Paris and an Honorary Member of the Faculty of Biology and Medical Science of the University of Chile. He became Consultant to the Health and Sanitary Division of the Office of the Coordinator of Inter-American Affairs in 1944, and consultant to the United States Public Health Service in 1945. In Philadelphia, Dr. Jackson is a member of the College of Physicians, the Philadelphia Laryngological Society, the Philadelphia County Medical Society, and the Laennec Society of Philadelphia (past President). He is a member of the Reading Eye, Ear, Nose and Throat Society, and the Pennsylvania Academy of Ophthalmology and Otolaryngology (Second Vice-President, 1951).

Dr. Jackson has always been especially interested in International relations, and attended the Second International Congress of Oto-Rhino-Laryngology in Madrid in 1932, the Third in Berlin in 1936, the Fourth in London in 1949. He attended the Second South American Congress of Oto-Rhino-Laryngology in Montevideo, Uruguay in 1944, and the next year, the Sixth Pan American Congress of Tuberculosis (ULAST) in Havana. In 1947 he attended the Seventh Pan American Congress of Tuberculosis (ULAST) in Lima, Peru, and in 1949 the Eighth in Mexico City. In 1946 he was organizer and Executive Secretary of the First Pan American Congress of Oto-Rhino-Laryngology and Broncho-Esophagology, meeting in Chicago. He attended the Second Pan American Congress of Oto-Rhino-Laryngology and Broncho-Esophagology in Montevideo and Buenos Aires in 1950, and has continued to serve as Chairman of the Committee, completing the organization of the Pan American Association of Oto-Rhino-Laryngology and Broncho-Esophagology. Dr. Jackson is a member of many medical societies, both American and



Fabian Bachrach

CHEVALIER L. JACKSON, M.D., F.C.C.P.
P R E S I D E N T

American College of Chest Physicians
1951 - 1952

foreign, as well as international. He is a member of the American Academy of Ophthalmology and Otolaryngology (Vice-President in 1943), a member of the American Laryngological, Rhinological and Otolological Society, the American Laryngological Society, and the American Broncho-Esophagological Association (President, 1951); the American Association for Thoracic Surgery, the American Trudeau Society, the American College of Surgeons, the International College of Surgeons, the American College of Chest Physicians (President, 1951). He is a Founder Member of the French Broncho-Esophagological Society, a member of the Argentine Broncho-Esophagological Society, and an Honorary Member of the Japan Broncho-Esophagological Society. He is just completing the organization of the International Broncho-Esophagological Society. He is a member of the Argentine Society of Oto-Rhino-Laryngology and kindred societies in Chile, Cuba, Mexico, Peru, Venezuela and a number of other foreign countries. He is a member of the Pan American Medical Association (Secretary), and a member of the United States Committee of the World Medical Association.

In 1948 Dr. Chevalier L. Jackson was awarded the Decoration of Commander of the Order of the Liberator San Martin by the Government of Argentina.

In the non-medical field, Dr. Jackson is a member of the Pan American Association of Philadelphia (past President), the World Affairs Council, the International House of Philadelphia (President, 1946), and the Alliance Francaise. He is also President of the Philadelphia Civic Grand Opera Company.

Dr. Jackson has been co-author with his father of a number of textbooks, and has himself contributed many articles to the literature of his specialty. He edited the Directory of Oto-Rhino-Laryngology in the Americas in 1946, and the new edition of that Directory which is about to appear; and is Editor-in-Chief of the Quarterly Review of Oto-Rhino-Laryngology and Broncho-Esophagology.

Interim Session American College of Chest Physicians

The Interim Session of the College will be held at the Ambassador Hotel, Los Angeles, California, December 2 and 3, 1951. The American Medical Association will hold its Interim Session in Los Angeles December 4-7.

On Sunday, December 2, the California Chapter of the College will sponsor a scientific program which will include round table luncheon meetings and an x-ray conference. A banquet will be held on Sunday evening. The Board of Regents of the College will hold its Interim Session meeting on Monday, December 3, and on that day various councils and committees will meet. Dr. Edward W. Hayes, Monrovia, has been appointed chairman of the general arrangements committee for the session and Dr. Alfred, Goldman, Los Angeles, chairman of the scientific program committee.

Seventeenth Annual Meeting American College of Chest Physicians

The Seventeenth Annual Meeting of the College was held at the Ambassador Hotel, Atlantic City, New Jersey, June 7 through 10, 1951. It was a most successful session, attendance reaching a total of 1040, the highest registration ever attained at a College meeting. Dr. Irving Willner, chairman of the general arrangements committee for the annual meeting, with the assistance of his committee members and the members of the local committees, handled the activities of the meeting in a splendid manner. The ladies reception committee is to be congratulated upon the lovely luncheon arranged for the visiting doctors' wives. The scientific sessions were of the highest caliber. Papers were presented on many subjects of particular interest to the chest specialist and special interest was shown in the several symposiums presented. Eighteen round table luncheon meetings were held, six on each day of the three-day session, and each discussion was attended by a capacity attendance. An outstanding X-Ray Conference was presented and the motion picture session was excellent.

On Thursday, June 7, the Seventh Annual Conference of College Chapter Officials was held, at which time past-presidents of College Chapters were presented with certificates of merit by the President of the College for their loyalty and support of the organization. Dr. William A. Hudson, Detroit, Michigan, was elected chairman for the next conference and Dr. Alfred Goldman, Los Angeles, California, was elected secretary.

The Board of Regents, Board of Governors and all councils and committees held their annual meetings on Thursday, June 7. Fifty-eight candidates for Fellowship in the College took their oral and written examinations on that date. On Saturday, June 9, one hundred Fellows of the College were awarded their Fellowship Certificates at the Convocation ceremony.

The Annual Presidents' Banquet was held at the Ambassador Hotel on Saturday evening, June 9. Dr. Louis Mark, Columbus, Ohio, retiring President of the College, presided and introduced Dr. Chevalier L. Jackson, Philadelphia, Pennsylvania, the incoming President, and Dr. Andrew L. Banyai, Milwaukee, Wisconsin, President-Elect, as well as the other officers of the College and the guests from other countries. Presentation was made of the 1951 College Gold Medal Award to Dr. Selman A. Waksman, New Brunswick, New Jersey, for meritorious achievement in diseases of the chest. Dr. Waksman gave an interesting and enlightening talk about the development of streptomycin. Dr. Eli H. Rubin, Bronx, New York, announced the winner of the Prize Essay Award for 1952. Professor Sirio Lentini, Department of Pathology, University of Rome, Rome, Italy, received the prize for his essay entitled "Roentgen-Tomography of the Posterior Pneumo-Mediastinum in the Diagnosis of Diseases of the Chest." Honorable mention was given Dr. Andre-Claude Thuilliez, Felleries-Liessies, France, and Dr. C. A. Forssander, Vancouver, B. C., Canada. The highlight of the banquet was the exhibition of a huge cake which was made as a replica of the new College building in Chicago.

New Officers of the College

The following officers were elected for the year 1951-1952:

OFFICERS

President Elect: Andrew L. Banyai, Milwaukee, Wisconsin.

First Vice President: Alvis E. Greer, Houston, Texas.

Second Vice President: William A. Hudson, Detroit, Michigan.

Treasurer: Minas Joannides, Chicago, Illinois.

Assistant Treasurer: Charles K. Petter, Waukegan, Illinois.

REGENTS

District No. 3: Burgess L. Gordon, Philadelphia, Pennsylvania.

District No. 6: Willard B. Howes, Detroit Michigan.

District No. 7: Otto L. Bettag, Chicago, Illinois.

District No. 9: Hollis E. Johnson, Nashville, Tennessee.

District No. 11: Carl H. Gellenthien, Val-nora, New Mexico.

District No. 12: Elliott Mendenhall, Dallas, Texas.

District No. 15: Angel M. Marchand, Santurce, Puerto Rico.

District No. 16: Hastings D. Walker, Honolulu, Hawaii.

GOVERNORS

Alabama: Vivian H. Hill, Mobile.

California: Buford H. Wardrip, San Jose.

Connecticut: Francis D. T. Bowen, Hartford.

Georgia: Osler A. Abbott, Atlanta.

Illinois: Darrell H. Trumpe, Springfield.

Louisiana: Alton Ochsner, New Orleans.

Massachusetts: Francis M. Woods, Boston.

Michigan: Constantine P. Mehas, Pontiac.

Minnesota: Herman J. Moersch, Rochester.

Mississippi: Robert E. Schwartz, Hattiesburg.

Missouri: Charles A. Brasher, Mt. Vernon.

New Jersey: Irving Willner, Newark.

New York: Foster Murray, Brooklyn.

Pennsylvania: Ross K. Childerhose, Harrisburg.

Tennessee: David H. Waterman, Knoxville.

Texas: Robert B. Morrison, Austin.

Utah: William R. Rumel, Salt Lake City.

Vermont: Albert G. Mackay, Burlington.

GOVERNORS IN U. S. GOVERNMENT SERVICES

U. S. Army: Eugene C. Jacobs, Washington, D. C.

U. S. Navy: Sidney A. Britten, Washington, D. C.

U. S. Public Health Service: Robert J. Anderson, Washington, D. C.

U. S. Veterans Administration: Arden Freer, Washington, D. C.

U. S. Indian Service: Arthur W. Dahlstrom, Rapid City, S. D.

GOVERNORS IN U. S. POSSESSIONS

Alaska: James E. O'Malley, Anchorage.

Hawaii: William F. Leslie, Hilo.

Puerto Rico: Jaime F. Pou, Hato Rey.

GOVERNORS IN OTHER COUNTRIES

Canada: Eastern Provinces: J. J. Quinlan, Nova Scotia.

Cuba: Teodosio Valledor, Havana.

All other Regents and Governors in other countries re-elected for 1 year.

ANNUAL MEETING, BOARD OF REGENTS, AMERICAN COLLEGE OF CHEST PHYSICIANS



Ambassador Hotel, Atlantic City, New Jersey, June 7, 1951.

Annual Meeting, Board of Regents
American College of Chest Physicians

ATLANTIC CITY, NEW JERSEY, JUNE 7-10, 1951

The Board of Regents of the College met in annual session at the Ambassador Hotel, Atlantic City, New Jersey, on Thursday, June 7, 2:00 p.m. and on Sunday, June 10, 5:00 p.m. The following Regents, alternates, council and committee chairmen and guests attended the sessions:

James H. Stygall, Indianapolis, Indiana, *Chairman*

Donato G. Alarcon, Mexico City, Mexico

Robert J. Anderson, Washington, D. C.

Russell S. Anderson, Erie, Pennsylvania

Andrew L. Banyai, Milwaukee, Wisconsin

B. Guy Begin, Montreal, Quebec

Otto L. Bettag, Chicago, Illinois

Otto C. Brantigan, Baltimore, Maryland

John F. Briggs, St. Paul, Minnesota

Dean B. Cole, Richmond, Virginia

Martin H. Collier, Blackwood, New Jersey

Seymour M. Farber, San Francisco, California

M. Jay Flipse, Miami, Florida

Louis L. Friedman, Birmingham, Alabama

Carl H. Gellenthien, Valmora, New Mexico

Alfred Goldman, St. Louis, Missouri

Burgess L. Gordon, Philadelphia, Pennsylvania

Edward A. Greco, Portland, Maine

Alvis E. Greer, Houston, Texas

Edward W. Hayes, Monrovia, California

T. G. Heaton, Toronto, Ontario

Willard B. Howes, Detroit, Michigan

William A. Hudson, Detroit, Michigan

Chevalier L. Jackson, Philadelphia, Pennsylvania

Robertson O. Joplin, Louisville, Kentucky

Edwin R. Levine, Chicago, Illinois

Milton I. Levine, New York, New York

Louis Mark, Columbus, Ohio

Donald R. McKay, Buffalo, New York

Elliott Mendenhall, Dallas, Texas

Jay Arthur Myers, Minneapolis, Minnesota

Antonio Navarrete, Havana, Cuba

James M. Odell, The Dalles, Oregon

William E. Ogden, Toronto, Canada

Richard H. Overholt, Brookline, Massachusetts

J. Winthrop Peabody, Washington, D. C.

Charles K. Petter, Waukegan, Illinois

Joseph C. Placak, Cleveland, Ohio

Eli H. Rubin, Bronx, New York

William R. Rumel, Salt Lake City, Utah

Harold G. Trimble, Oakland, California

Irving Willner, Newark, New Jersey

Murray Kornfeld, Chicago, Illinois, Executive Secretary
Harriet E. Lumm, Chicago, Illinois, Executive Assistant
Samuel N. Turiel, Chicago, Illinois, Executive Assistant.

At the first session of the Board, Dr. Stygall called the meeting to order and after the signing of the College Roster, new Regents and guests were introduced.

The first report was that of the Treasurer of the College. In the absence of Dr. Benjamin L. Brock, Assistant Treasurer of the College, Dr. Charles K. Petter presented this report. The report of the Treasurer was unanimously accepted.

Dr. Louis Mark presented a report on the building purchased by the College to which the Executive Offices would be moved on July 1. The Board extended a vote of thanks to Dr. Mark and to the other members of the committee for their services in successfully concluding the negotiations for the purchase of the building.

Dr. Irving Willner, chairman of the Committee on Arrangements for the Seventeenth Annual Meeting of the College, was called upon to give a report on the arrangements for the scientific and social activities of the meeting. The Board of Regents extended their appreciation to Dr. Willner and his committees for their excellent work in arranging the meeting.

The next report received was that of the Committee on Scientific Program presented by Dr. Edwin R. Levine, chairman. Dr. Levine and his committee members were extended a vote of thanks by the Board of Regents for the fine scientific program which had been arranged.

The report of the Editorial Board was presented by Dr. Jay Arthur Myers, Editor-in-Chief of the College journal, *Diseases of the Chest*. Dr. Myers discussed the scientific material as well as the advertising appearing in the journal, and urged the members of the Board of Regents to actively participate in the procurement of outstanding scientific contributions for publication in the College journal, and to assist whenever possible in obtaining new advertisers.

Dr. Edward W. Hayes presented a brief report of the activities of the Council on Undergraduate Medical Education, of which he serves as chairman. Reprints of Dr. Hayes' article entitled, "Teaching of Diseases of the Chest in Medical Schools," which was published recently in *Medical Education*, were distributed to the Board members.

A report was presented by Dr. J. Winthrop Peabody, chairman of the Council on Postgraduate Medical Education of the College, in which postgraduate courses in diseases of the chest, sponsored by the College over a period of four years with a comparative listing of enrollment figures, was shown. Dr. Antonio Navarrete reported on the successful postgraduate course sponsored by the Cuban Chapter of the College in Havana last December.

Dr. Andrew L. Banyai, Editor of the new book on non-tuberculous diseases of the chest being published under the sponsorship of the College reported on its progress. The Board of Regents was informed that the book is now set in type and upon return of the corrected proofs from the contributors, publication would proceed without delay.

Dr. Robert J. Anderson, chairman of the Council on Public Health of the College, reported the activities of the council and plans for its future program.

The report of the Committee on Chest Diseases in Institutions was

presented by Dr. Otto L. Bettag, chairman of the committee. Dr. Bettag discussed the survey of penal and mental institutions which is being made, and stated that the complete report would be available in the near future.

Dr. Stygall, chairman of the Council of Tuberculosis Committees, reported that papers on the subject of the care of tuberculous patients in general hospitals had been obtained by his council for publication in the College journal, *Diseases of the Chest*. The first of these papers has already been published and the two additional papers will appear shortly. It is planned to have reprints prepared of these papers for distribution to interested physicians. The first paper, published in the April, 1951 issue of *Diseases of the Chest*, was authored by Dr. Harold C. Ochsner, Indianapolis, Indiana, entitled "The Chest Survey of a Large General Hospital." The papers soon to be published are "The Tuberculous Patient in the General Hospital" by Drs. James S. Edlin, Sidney Bassin and Alfred A. Richman, New York City, and "The Practical Use of an Isolation Ward in a General Hospital for the Treatment of Tuberculosis" by Dr. Robert E. Neff, Indianapolis, Indiana.

The report of the Committee on Occupational Diseases of the Chest was presented by the chairman, Dr. Louis L. Friedman. This committee has been organized to work conjointly with a similar committee of the Industrial Medical Association. Dr. Friedman pointed out that the joint committee was sponsoring a symposium on occupational diseases of the chest to be presented in the scientific program of the College meeting on Sunday, June 10th.

In the absence of Dr. Edgar Wayburn, chairman of the Council on Public Relations, the report of that council was presented by Dr. Robertson O. Joplin. A report listing the medical journals in the United States and other countries that published notices concerning the activities of the American College of Chest Physicians was distributed. The comparative report of notices published during the years 1948, 1949 and 1950 indicated an increase of from 38 notices in 1948, to 44 in 1949, and 180 notices in 1950.

The report of the Committee on College Essay was presented by Dr. Eli H. Rubin, who served as chairman of the committee since the inception of the Essay Contest two years ago. Dr. Rubin made a number of recommendations to the board concerning the structure and operation of the committee. The Board of Regents requested Dr. Rubin to prepare his recommendations for submittal to the Executive Council of the College for consideration.

Dr. J. Winthrop Peabody, chairman of the Committee on Board Certification, presented a progress report of the activities of his council and was requested to present his report at the administrative session on Saturday morning, June 9th.

The report of the Committee on Membership was presented by Dr. Chevalier L. Jackson, chairman, and unanimously approved by the Board.

Dr. Andrew L. Banyal presented the report of the Committee on College Award and announced the name of the recipient of the 1951 College Medal for meritorious achievement in diseases of the chest. The Board of Regents enthusiastically approved the selection of Dr. Selman A. Waksman as the choice of the committee.

The following resolutions were presented and unanimously approved by the Board:

WHEREAS, The American Medical Association has cancelled their plans to hold their 1951 Interim Session in Houston, Texas, and have transferred the meeting to Los Angeles, California, and

WHEREAS, The American College of Chest Physicians has customarily held its Interim Session in the same city and just prior to the Interim Session of the American Medical Association,

THEREFORE BE IT RESOLVED, That the Board of Regents of the College also transfer the Interim Session of the College to Los Angeles, California.

WHEREAS, Dr. Charles M. Hendricks served as the first Editor-in-Chief of the College journal, *Diseases of the Chest*, and

WHEREAS, He has served faithfully and diligently as a member of the Editorial Board since the inception of the College journal,

THEREFORE BE IT RESOLVED, That the Board of Regents of the College honor Dr. Charles M. Hendricks by electing him Editor Emeritus of *Diseases of the Chest*, and

BE IT FURTHER RESOLVED, That Dr. Milton W. Anderson, Rochester, Minnesota, be elected a member of the Editorial Board to fill the place left vacant on the Board.

WHEREAS, The activities of the American College of Chest Physicians have expanded into 63 countries, and

WHEREAS, There is a demand for Fellowships in diseases of the chest from members of the College desiring to do postgraduate study in the United States,

THEREFORE BE IT RESOLVED, That a committee on College fellowships be appointed by the President of the College to further this worthy activity.

WHEREAS, A number of members interested in cardiovascular diseases have been enrolled as members of the American College of Chest Physicians, and

WHEREAS, This subject is of great interest to all members of the College,

THEREFORE BE IT RESOLVED, That the President of the College be authorized to appoint a committee on Diseases of the Cardiovascular System to serve under the Council on Management and Treatment of Diseases of the Chest of the College.

The meeting was adjourned at 4:30 p. m.

The second meeting of the Board of Regents was held on Sunday, June 10, at 5:00 p. m. The meeting was called to order by Dr. Stygall, chairman of the Board, new Regents and guests were introduced, and the College Roster was signed.

Dr. Alvis E. Greer, chairman of the Board of Examiners, presented the first report. He announced that oral and written examinations were given to 58 applicants for Fellowship in the College at Atlantic City.

The chairman of the Committee on Personnel, Dr. Andrew L. Banyal, presented a resolution proposing that his committee be authorized to execute and approve a contract for the services of the Executive Secre-

tary of the College. The resolution was moved for adoption by Dr. John F. Briggs, seconded by Dr. William A. Hudson, and unanimously approved.

Dr. Edwin R. Levine presented the report of his Council on the Management and Treatment of Diseases of the Chest, as well as those of the Committee on Surgical Treatment, Chemotherapy and Antibiotics and Physiologic Treatment, which serve under his council. Dr. Harold G. Trimble, chairman of the Committee on Non-Surgical Collapse Therapy, who attended the meeting of the Board, presented his report. This committee also serves under the Council on the Management and Treatment of Diseases of the Chest.

In the absence of Dr. Russell S. Anderson, Dr. Otto L. Bettag presented the report of the Council of Tuberculosis Hospitals. Dr. Flipse moved that the report be accepted, but that some of the recommendations be discussed further before approved by the Board. This motion was seconded by Dr. Overholt and unanimously adopted.

The report of the Mid-Century White House Conference on Children and Youth was presented by Dr. Milton I. Levine, official representative of the College to the Conference. The report was moved for acceptance by Dr. Hudson, seconded by Dr. Briggs, and unanimously adopted with a vote of appreciation to Dr. Levine.

Dr. Chevalier L. Jackson presented the report of the Council on International Affairs and discussed the coming meeting of the Union of Latin American Tuberculosis Societies (ULAST) which is to be held in Guayaquil, Ecuador, July 14-22, 1951. Dr. Jackson, Dr. Paul H. Holinger, and Mr. Murray Kornfeld will attend the meeting in Guayaquil. The Council on Pan American Affairs of the College will meet in Guayaquil on July 18. Dr. Jackson then presented a report concerning plans for the Second International Congress on Diseases of the Chest to be held in Rio de Janeiro in 1952. He informed the Board of Regents that the Executive Secretary of the College, Mr. Murray Kornfeld, would travel to Rio de Janeiro after the ULAST meeting in Guayaquil, to meet with the physicians there and make the necessary arrangements for the Congress. It was recommended that the Board of Regents pledge the full support of the American College of Chest Physicians in making the meetings of the Second International Congress of the College and the International Union Against Tuberculosis a success. This recommendation was moved for adoption by Dr. Farber, seconded by Dr. Gellenthien, and unanimously approved. In the absence of Dr. Overholt, who had to leave the meeting before its close, Dr. Jackson presented the report of the Council on Pan American Affairs. The report of the Council on Pan Pacific Affairs was presented by Dr. Seymour M. Farber, the chairman.

Dr. Hayes moved that Dr. Joseph C. Placak be elected a member of the Committee on Nominations for the coming year. The motion was seconded by Dr. Mark and unanimously carried.

Dr. Greco moved that Dr. Donald R. McKay be re-elected Regent-at-Large, seconded by Dr. Myers, and unanimously approved.

Dr. Hudson moved that Dr. Carl C. Aven be elected Historian of the College. This motion was seconded by Dr. Hudson and unanimously carried.

Dr. Mark moved that Dr. James H. Stygall be re-elected Chairman of the Board of Regents, seconded by Dr. Hudson, and unanimously carried.

Dr. Mark then recommended that telegrams be sent to Dr. Hollis E. Johnson and Dr. Minas Joannides expressing the best wishes of the Board

for their prompt recovery. The motion was seconded by Dr. Flipse and unanimously approved.

Dr. Mark moved the adoption of a resolution expressing the appreciation of the Board of Regents to Dr. Charles M. Hendricks for his wonderful and untiring efforts in behalf of the Council on Research of the College. It was announced that Dr. Hendricks was in New York City at the present time engaged in negotiations for the establishment of a Common Cold Foundation. The resolution was seconded by Dr. Flipse with the recommendation that the Board also express regret that Dr. Hendricks was unable to leave New York to attend the College meeting, and to wish him every success in his venture. This resolution and the amendments were unanimously adopted.

A resolution submitted by Dr. Paul H. Holinger was read in which it was recommended that a Committee on Motion Pictures be established in the College. Dr. Flipse moved the adoption of the resolution with a recommendation that Dr. Holinger be appointed chairman, which was seconded by Dr. Briggs and unanimously approved.

Dr. Jackson moved the adoption of a resolution recommending the establishment of a Committee on Broncho-Esophagology, which was seconded by Dr. Bettag and unanimously adopted.

Dr. Farber opened discussion concerning the possible formation of a Committee on Veterans Affairs to which problems concerning veteran patients may be referred. Dr. Mark moved that this committee be established, seconded by Dr. Hayes, and unanimously carried.

Mr. Kornfeld read a letter addressed to the College by Dr. Brock Chisholm, Director of the World Health Organization, in which it was stated that the American College of Chest Physicians was made a member organization. Other correspondence read was a letter from Dr. Robert J. Anderson, Chief, Division of Chronic Disease and Tuberculosis, U. S. Public Health Service, congratulating the College upon its membership in the World Health Organization, and a letter received from Mr. William Barrett, Assistant Secretary of State, requesting an opinion from the College concerning the activities of the Department in Rome, which the members of the College may have had an opportunity to observe during their attendance of the First International Congress on Diseases of the Chest held there in September, 1950.

Announcement was made that the registration at the Seventeenth Annual Meeting of the College reached a total of 1040, the largest attendance ever attained. The dates of the Interim Session of the College, which is to be held at the Ambassador Hotel, Los Angeles, California, were announced as December 2 and 3, 1951.

Dr. Briggs recommended that the Board extend their appreciation to the staff at the Executive Offices of the College for their fine work. This recommendation was unanimously approved.

The meeting was then adjourned. Complete council and committee reports will be published in future issues of the College journal.

Section on Diseases of the Chest in the American Medical Association

At the meeting of the Section on Diseases of the Chest of the American Medical Association held in Atlantic City, New Jersey, on Thursday, June 14, the following officers were elected:

J. Winthrop Peabody, Washington, D. C., Chairman
Joseph C. Placak, Cleveland, Ohio, Vice-Chairman
Hollis E. Johnson, Nashville, Tennessee, Delegate
Edward W. Hayes, Monrovia, California, Alternate
Dr. Jay Arthur Myers, Minneapolis, Minnesota, Secretary of
the Section, continues for another year.

Scientific Exhibits, Section on Diseases of the Chest American Medical Association

There were twelve exhibits in the Section on Diseases of the Chest of the American Medical Association at the Atlantic City meeting in June. Four of the twelve exhibits received awards, consisting of a gold medal, a certificate of merit, and two honorable mentions.

The gold medal was awarded to Robert P. Glover, Charles P. Bailey, and Thomas J. E. O'Neill, Hahnemann Medical College and Hospital, Episcopal Hospital, Philadelphia, for the exhibit on "Intracardiac Surgery for Acquired and Congenital Heart Disease."

Chevalier L. Jackson, John Franklin Huber and Charles M. Norris, Temple University School of Medicine, Philadelphia, received a Certificate of Merit for the exhibit on the "Segmental Bronchi and Bronchopulmonary Segments."

Honorable mention was given to Hurley L. Motley, Burgess L. Gordon, Peter A. Theodos and Joseph F. Tomashefski, Barton Memorial Hospital, Philadelphia, for the exhibit on "Studies of Pulmonary Function Impairment in Coal Miners."

The other Honorable mention was awarded to Samuel H. Belgorod, New York City, for the exhibit on "Chemotherapy in Tuberculosis."

The Section on Diseases of the Chest in the Scientific Exhibits is now three years old and has received a medal each year since its inception. In 1949, at the Atlantic City meeting, a bronze medal was awarded J. R. McDonald, L. B. Woolner and A. H. Bulbulian, Mayo Clinic, Rochester, Minnesota, for the exhibit on "Tumors of the Lung — A Pathologic Study of Surgical Lesions." The exhibit on "Granulomas of the Lung — Bacteriologic and Pathologic Study of Resected Lesions" by Lyle A. Weed and L. B. Woolner, Mayo Clinic, Rochester, Minnesota, received the silver medal at the 1950 meeting in San Francisco, California.

The representative to the Scientific Exhibits from the Section on Diseases of the Chest is Dr. Edwin R. Levine, Chicago, Illinois.



DR. SELMAN A. WAKSMAN

Dr. Selman A. Waksman Receives College Medal

Dr. Selman A. Waksman, the discoverer of streptomycin, whose work has changed the entire course of treatment of tuberculosis and many other diseases, received the 1951 American College of Chest Physicians award for meritorious achievement in diseases of the chest. The College Medal was presented to Dr. Waksman at a dinner during the annual meeting of the College held at the Ambassador Hotel in Atlantic City, Saturday, June 9th.

Dr. Andrew L. Banyal of Milwaukee, chairman of the College Awards Committee, said: "It is because of Dr. Waksman's accomplishments that thousands of people throughout the world are alive and well; happy and useful citizens who would otherwise have long ago died of tuberculosis. It has been seldom in the history of medicine that so many have owed so much to one man."

Dr. Waksman, whose fame is worldwide, came to this country as a young man. He graduated from Rutgers University in 1911 and became a naturalized citizen in 1916. Following special work in biochemistry at the University of California, he joined the New Jersey Experimental Station and the faculty of Rutgers University where in 1940 he became Professor and Head of the Department of Microbiology and recently, Director of the Institute of Microbiology. He has published more than 350 scientific papers and has been author of eleven books. He is credited with the isolation of eleven new antibiotics, in addition to the epoch-making discovery of streptomycin. He has received ten awards in this and other countries and is a Commander of the Legion of Honor (France). Dr. Waksman is the fifth world-renowned scientist to receive the award for meritorious achievement in diseases of the chest from the American College of Chest Physicians.

Report of the Historian

ATLANTIC CITY, NEW JERSEY, JUNE 9, 1951

Mr. President, Fellows of the American College of Chest Physicians,
Ladies and Guests:

The work of this 17th Annual meeting has brought forth much that indicates the sound thinking, the unswerving steadfastness of purpose of each of those who have contributed to the growth and expansion of the healing art. Many continue in this service; others have completed their work. It is proper that at this moment when new names are being added to our membership rolls, that we pause to pay respect and to do honour to those physicians who have finished their work and have passed to their rewards. Through services to their fellow men, these physicians have tasted the fruits of success, success not determined by the magnitude of material recompense. Success to them lay in the knowledge that day by day they recognized more clearly the frailties of the human body, and that they were possessed of an increasing knowledge of the means of affording relief from these frailties. Their constancy and steadfastness of purpose did not waver under the strain of social or

economical upheaval. The wear and tear of such experiences served only to make brighter the luster and brilliance of the golden thread of service.

Man, from the time of his creation, has been blessed with moral attributes impelling him to relieve the helpless and sick. The benefits of this inherent moral force have fallen upon all who have been touched by this golden thread of service. Certain men have been blessed with a greater portion of this moral attribute, or have been better equipped to give expression to its impelling force than have others. Such men are termed Physicians. It is proper that physicians of all races, creeds, and climates (friend and foe alike) work and study as one to the end that all mankind may benefit through their exchange of ideas.

The names of our Fellow Physicians who have completed their work, follow:

- James L. Anderson, San Antonio, Texas
- Leslie P. Anderson, Yakima, Washington
- Luis Arantes de Almeida, Rio de Janeiro, Brazil
- Kenneth L. Burt, Kalamazoo, Michigan
- Silvestro Canova, Rome, Italy
- Anthony B. Danisawich, South Mountain, Pennsylvania
- Michael Gleason, Mendota, Illinois
- Edson W. Glidden, Worcester, Massachusetts
- Walter R. Gumprecht, Bangor, Maine
- Germaine A. Guntzer, Honolulu, Hawaii
- Eugene Cyrus Hawks, Rockville, Maryland
- John W. Huston, Ashville, North Carolina
- Charles C. Kastenbaum, New York, New York
- Thaddeus M. Koppa, Dallas, Texas
- Frank Lande, McConnelsville, Ohio
- Angus E. MacMillan, Chehalis, Washington
- Julio C. Mata, Guayaquil, Ecuador
- John M. McDougall, Brantford, Ontario, Canada
- Maxwell D. Ryan, New York, New York
- Juan J. Samaniego, Quito, Ecuador
- Stewart S. Shaffer, Mt. Wilson, Maryland
- Elliott P. Smart, Murphys, California
- William C. Spalding, Los Angeles, California
- Gideon M. Van Poole, Honolulu, Hawaii
- Rowland H. Walker, Jr., Norfolk, Virginia

Ubaldo E. Zambarano, Providence, Rhode Island

Governor of the College for Rhode Island.

A smiling messenger of hope, beloved by his friends and patients for his kind and understanding personality.

Pedro L. Farinas, Havana, Cuba

At the time of his death, President of the Cuban Chapter of the College and organizer of the postgraduate course in Cuba.

Stephen A. Douglass, Ocala, Florida

Past President of the New Jersey Chapter.

Rene Jeanneret, Leysin, Vaud, Switzerland

An active worker with the World Health Organization.

Burt K. Shurly, Detroit, Michigan

As a soldier, financier, teacher, administrator, public official and physician he exhibited a wealth of patience and understanding combined with a steadfastness of purpose that won for him the love and respect of all. His decisions were always characteristically his own. His love for the healing art was expressed in his long association with organized medicine, his sponsorship of hospitals, a medical school, and his energetic and successful efforts toward the establishment of the section on diseases of the chest in the American Medical Association. Fidelity being one of his strong characteristics, his family ties were close and very dear to him. In his death, the Country lost a good citizen, the community a benefactor, and the profession a physician possessed of great powers of good.

Though we may not share the genius of these departed fellow physicians, let us continue faithful to the traditions which we now inherit.

William A. Hudson, Historian.

College Essay Award

The Board of Regents of the American College of Chest Physicians offers a cash prize award of two hundred fifty dollars (\$250.00) to be given annually for the best original contribution, preferably by a young investigator, on any phase relating to chest disease.

The prize is open to contestants of other countries as well as those residing in the United States. The winning contribution will be selected by a board of impartial judges and the award, together with a certificate of merit, will be made at the forthcoming annual meeting of the College. Second and third prize certificates will also be awarded.

All manuscripts submitted become the property of the American College of Chest Physicians and will be referred to the Editorial Board of the College journal, "Diseases of the Chest," for consideration. The College reserves the right to invite the winner to present his contribution at the annual meeting. Contestants are advised to study the format of "Diseases of the Chest" as to length, form and arrangement of illustrations, to guide them in the preparation of the manuscript.

The following conditions must be observed:

- (1) Five copies of the manuscript, typewritten in English, should be submitted to the executive office, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois, not later than April 1, 1952.
- (2) The only means of identification of the author or authors shall be a motto or other device on the title page, and a sealed envelope bearing the same motto on the outside, enclosing the name of the author or authors.

Committee on College Essay

Henry C. Sweany, M.D., Chairman

E. Raymond Fenton, M.D.

Hugh L. Houston, M.D.

Joseph F. Hiatt, M.D.

David Salkin, M.D.

Committee on College Fellowships Established

At the annual meeting of the Board of Regents of the College held in Atlantic City, June 7, a recommendation proposing the establishment of a Committee on College Fellowships was approved. This committee is now being organized. Its purpose will be to assist physicians in other countries who wish to do postgraduate work in the United States to obtain fellowships in hospitals and sanatoria. Funds will be available for their transportation and a small stipend allotted for living expenses. As the funds made available for this worthy purpose are increased, larger numbers of physicians may be accepted for such fellowships. For further information and fellowship application forms, please address the American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois.

College Chapter News

EUROPEAN CHAPTER

The organizational meeting of the European Chapter of the College will be held in Paris, France on September 15. Dr. Andre Meyer, Paris, a Governor of the College for France, is the chairman of the meeting. Dr. Edgar Mayer, New York City, will present a paper in the scientific program which is being arranged.

ILLINOIS CHAPTER

The annual meeting of the Illinois Chapter of the College was held on May 23, 1951 and the following officers were elected for the coming year:

Charles K. Petter, Waukegan, President,
William J. Bryan, Rockford, Vice-President,
Abel Froman, Chicago, Secretary-Treasurer.

Abel Froman, Secretary.

MICHIGAN CHAPTER

A meeting of the Michigan Chapter of the College was held at the Detroit Tuberculosis Sanatorium on May 24, 1951. After an excellent dinner given by Dr. Willard B. Howes and his staff, the following program was presented: "Malignant Thymoma Associated with Myasthenia-Gravis; Report of a Case," by Dr. Reubin I. Shapiro.

A business meeting was held following the scientific program at which time plans were formulated for the meeting of the Michigan Chapter of the College to be held in conjunction with the annual meeting of the Michigan State Medical Society. This meeting will be held at the Pantlind Hotel, Grand Rapids, Michigan, September 27, 1951.

The following officers were elected for the coming year:

Benjamin E. Goodrich, Detroit, President,
C. P. Mehas, Pontiac, Vice-President,
Lawrence A. Pratt, Detroit, Secretary-Treasurer.

Lawrence A. Pratt, Secretary.

TEXAS CHAPTER

The Texas Chapter of the College held its annual meeting on April 30 at the Buccaneer Hotel, Galveston. The following officers were elected for 1951-1952:

James E. Dailey, Houston, President
Robert B. Morrison, Austin, First Vice-President
Henry R. Hoskins, San Antonio, Second Vice-President
Howard E. Smith, Austin, Secretary-Treasurer.

Howard E. Smith, Secretary.

ANNUAL MEETING, GREEK CHAPTER, AMERICAN COLLEGE OF CHEST PHYSICIANS



Seated, from left to right: Drs. P. Chortis, N. Oekonomopoulos, N. Yianopoulos, B. Papanicolaou. — Standing, left to right: Drs. B. Malerdos, S. Kakavias, J. Lameris, I. Papateas, N. Anastasiou, G. Papastathopoulos, K. Kokinakis.

GREEK CHAPTER

At the annual meeting of the Greek Chapter of the College, the following officers were elected for the ensuing year:

Panayiotis Chortis, Athens, President,
Eugene Joannides, Athens, Vice-President,
John Lameris, Athens, Secretary-Treasurer.

A photograph taken at the time of the annual meeting appears on the opposite page.

John Lameris, Secretary.

NEW JERSEY CHAPTER

We regret that the officers of the New Jersey Chapter of the College were published incorrectly in the July issue of *Diseases of the Chest*. The officers of the New Jersey Chapter for the year 1951-1952 are as follows:

Juan R. Herradora, Jersey City, President,
John Rinnells, Scotch Plains, First Vice-President,
J. Earle Stuart, Plainfield, Second Vice-President,
Irving J. Sellikoff, Paterson, Secretary-Treasurer.

Irving J. Sellikoff, Secretary.

NORTHERN CHAPTER, SOUTH AFRICA

The first informal meeting of the Northern Chapter of the College in South Africa was held in Johannesburg on May 29, 1951. There were eight members and eighteen guests present at the meeting which was held at the Medical House. The chapter will be formally established in the near future. The following officers, *pro tem*, were elected:

Maurice A. Pringle, Transvaal, President,
Libero Fatti, Johannesburg, Vice-President,
Walter S. Linton, Transvaal, Secretary-Treasurer.

Walter S. Linton, Secretary.

WISCONSIN CHAPTER

The annual meeting of the Wisconsin Chapter of the College will be held at the Schroeder Hotel, Milwaukee, on Sunday, September 30, 1951. Registration will open at 1:00 p. m. The following scientific program will be presented:

"Diagnosis and Management of Esophageal Hiatus Hernia,"
Joseph Shaiken, Milwaukee, Wisconsin.

"Primary Tuberculosis in Adults,"
Jay Arthur Myers, Minneapolis, Minnesota.

"The Significance of the Broncho-Pulmonary Segments,"
Chevalier L. Jackson, Philadelphia, Pennsylvania.

"Pseudopathology in Chest Roentgenograms,"
Hans W. Hefke, Milwaukee, Wisconsin.

"Physiological Considerations in the Diagnosis and Management of Chronic Pulmonary Diseases,"
Burgess L. Gordon, Philadelphia, Pennsylvania.

Leon H. Hirsh, Secretary.

College News Notes

Dr. Burgess L. Gordon was recently appointed President of the Women's Medical College of Pennsylvania, to take office on September 1st. Dr. Gordon is Professor of Clinical Medicine and Director of the Department of Diseases of the Chest at Jefferson Medical Center. The Women's Medical College of Pennsylvania was founded in 1850 and was the first in the world for the education of women in medicine. It is the only women's medical college in the Western Hemisphere.

Dr. Allan Hurst has announced the opening of his office for the practice of diseases of the chest and internal medicine. His new address is 1578 Humboldt Street, Denver, Colorado. Dr. Hurst was formerly medical director of the National Jewish Hospital in Denver.

Dr. Emil Bogen, Olive View, California, was elected president of the California Tuberculosis and Health Association for the year 1951-1952. He was also awarded the California medal for distinguished service in tuberculosis control.

Dr. Leo G. Rigler, Minneapolis, will be one of eleven American and five European doctors who will go to Israel next fall as a United Nations world health organization medical team to help with teaching and public health problems.

COURSE IN BRONCHESOPHAGOLOGY

The next course in Bronchoesophagology will be given September 17 to 28, 1951. For application forms and further information please communicate with the Department of Broncho-Esophagology, Lab 604, Temple University School of Medicine, 3400 North Broad Street, Philadelphia 40, Pennsylvania.

Chevalier Jackson and Chevalier L. Jackson.

COLLEGE EVENTS

Interim Session, American College of Chest Physicians,
Ambassador Hotel, Los Angeles, California, December 2-3, 1951.

European Chapter Meeting, Paris, France, September 15, 1951.

Chicago Postgraduate Course, September 24-28, 1951.

Michigan Chapter Meeting, Grand Rapids, September 27, 1951.

Wisconsin Chapter Meeting, Milwaukee, September 30, 1951.

Minneapolis Postgraduate Course, October 18-20, 1951.

Portland Postgraduate Course (Oregon), October 29-31, 1951.

Southern Chapter Meeting, Dallas, Texas, November 4-5, 1951.

New York City Postgraduate Course, November 12-17, 1951.

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MEDICAL SERVICE BUREAU POSITIONS AVAILABLE

Several positions open for chest specialists for tuberculosis hospitals in Florida. Salaries, depending upon experience and training, from \$4,200 to \$6,000 including house and maintenance. Please address Box 231A, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Ill.

Senior resident physician wanted for 200-bed tuberculosis sanatorium near Philadelphia. Approved AMA Quarters. Maintenance. Salary open. Please address Box 226A, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois.

Medical director, 100-bed tuberculosis hospital, southern state, North American graduate, \$7,000 per year and complete maintenance. Please address Box 227A, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois.

Industrial medicine. Iron mining. Full time physician. No private practice. No direct responsibility for therapy—medical, surgical, or first aid—but supervision of all activities affecting health and hygiene of approximately 5,000 employees in an area with an expanding future. An assistant is needed who must be capable of assuming the direction of this Department of Industrial Hygiene within several years. Suggested qualifications: (1) Background training in chest diseases desirable, (2) 35 to 45 age limits preferable; (3) previous experience in industrial medicine not essential. Salary open. Please address George McL. Waldie, M.D., Director, Cleveland-Cliffs Iron Company, Ishpeming, Michigan.

Assistant medical director for tuberculosis sanatorium in Southwest. Salary \$5,000 annually with partial maintenance. Please address Box 229A, American College of Chest Physicians, 112 E. Chestnut St., Chicago 11, Ill.

Senior resident physician wanted for Eastern sanatorium. American graduate with tuberculosis training in American sanatoria including post-operative care of chest surgical cases. Married physician with family accepted. Complete maintenance. State salary desired in first communication. Please address Box 230A, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois.

Research Fellow in Medicine, Tufts College Medical School and Resident in Medicine, Boston City Hospital, Dr. M. S. Segal's laboratory, available July 1, 1951 or January 1, 1952. Board, room

and adequate salary for someone interested in diseases of the chest. Please write Dr. Maurice S. Segal, Director, Department of Inhalational Therapy, Boston City Hospital, Boston, Mass.

Resident physician wanted for 60 bed sanatorium, excellent facilities for medical and surgical treatment of chest diseases. Salary from \$5000 to \$6000, per year with full maintenance, depending upon experience. Graduate of American school with tuberculosis training preferred. Please address Box 224A, American College of Chest Physicians, 112 East Chestnut St., Chicago 11, Illinois.

Medical assistant needed at tuberculosis hospital in Ohio; graduate of American school, eligible for Ohio license. Salary open. Single man or woman preferred. Please address Box 225A, American College of Chest Physicians, 112 East Chestnut St., Chicago 11, Illinois.

Staff physician wanted for 160 bed tuberculosis hospital situated in the Pacific Northwest. Physician should be eligible for Oregon license. Salary \$495 to \$555 per month with complete maintenance. Full particulars given upon request. Please address inquiries to Box 221A, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois.

Resident for 175 bed, fully approved, tuberculosis hospital; salary \$3000 per year, less nominal sum for maintenance. Please apply to Medical Director, Mahoning Tuberculosis Sanatorium, 4880 Kirk Road, Youngstown 7, Ohio.

POSITIONS WANTED

Young thoracic surgeon, qualified for boards, experienced in all aspects of surgery for pulmonary tuberculosis, including resection, and in cardiovascular surgery, interested in obtaining position with or without general surgery. Please address Box 255B, American College of Chest Physicians, 112 E. Chestnut St., Chicago 11, Ill.

Thoracic surgeon finishing fellowship in thoracic surgery at Sea View Hospital, Staten Island, New York, with six years experience in medicine and surgery for tuberculosis, desires a residency in thoracic surgery, preferably with opportunity to do general surgery. Please write: Dr. Ofelia Avila, Sea View Hospital, Staten Island 14, New York.

Physician desires residency in tuberculosis hospital or sanatorium. Experienced. For further information please address Box 257B, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois.

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Glenroy N. Pierce, M.D., San Francisco
W. Dale Peterson, M.D., Oakland

Consulting Pathologist

E. Gwyn Roberts, M.D., San Francisco

Medical Director

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**E. W. HAYES, M.D.
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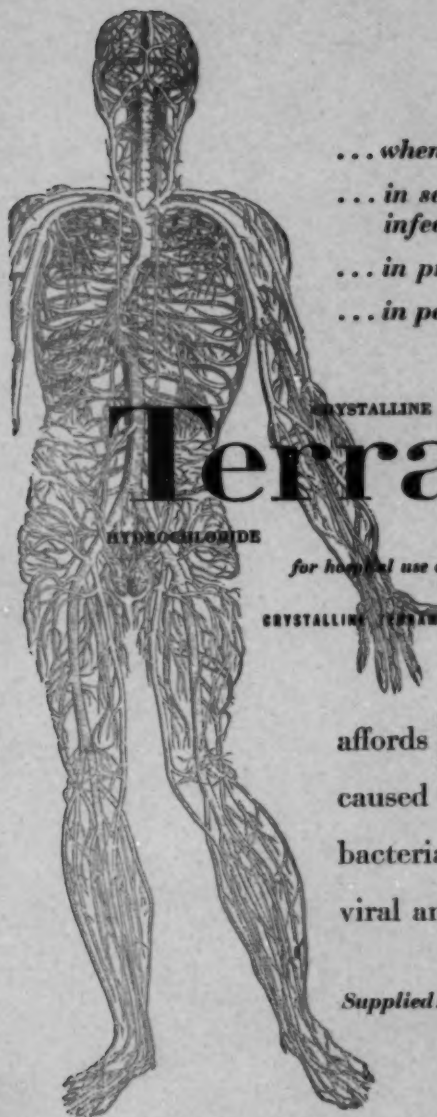
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